Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: DESIGN OF CONCRETE BRIDGE STRUCTURES	
Course Code: **18CSE31**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 50 = 100
Credits: 04	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To learn principles of Bridge Design.
2	To design different types of structures and to detail the structures.
3	To evaluate performance of the Bridge structures.

UNIT – I	
INTRODUCTION: Historical Developments, Site Selection for Bridges, Classification of Bridges Forces on Bridges. Bridge substructures: Abutments, piers and wing walls Balanced Cantilever Bridge: Introduction and proportioning of components, Design of simply supported portion and design of cantilever portion, design of articulation, ROB (Road Over Bridges), RUB (Road Under Bridges) and Box Pre-Stressing.	**12Hrs**
UNIT – II	
BOX CULVERT: Different Loading Cases IRC Class AA Tracked, Wheeled and Class A Loading, working out the worst combination of loading, Moment Distribution, Calculation of BM & SF, Structural Design of Slab Culvert, with Reinforcement Details.	**10Hrs**
UNIT – III	
T BEAM BRIDGE SLAB DESIGN: Proportioning of Components Analysis of interior Slab & Cantilever Slab Using IRC Class AA Tracked, Wheeled Class A Loading, Structural Design of Slab, with Reinforcement Detail. T Beam Bridge Cross Girder Design: Analysis of Cross Girder for Dead Load & Live Load Using IRC Class AA Tracked, Wheeled Class A Loading A Loads, Structural Design of Beam, with Reinforcement Detail.	**10Hrs**
UNIT – IV	
T BEAM BRIDGE MAIN GIRDER DESIGN: Analysis of Main Girder for Dead Load & Live Load Using IRC Class AA Tracked, Wheeled Class A Loading Using COURBON'S Method, Analysis of Main Girder Using HENDRY-JAEGER and MORICE- LITTLE Method for IRC Class AA Tracked vehicle only, BM & SF for different loads, Structural Design of Main Girder With Reinforcement Details.	**10Hrs**
UNIT – V (Blended learning)	
PSC BRIDGES: Introduction to Pre and Post Tensioning, Proportioning of Components, Analysis and Structural Design of Slab, Analysis of Main Girder using COURBON's Method for IRC Class AA tracked vehicle, Calculation of pre-stressing force, cable profile and calculation of stresses, Design of End block and detailing of main girder.	**10Hrs**

Course Outcomes: The students will be able to	
1	Achieve Knowledge of design and development of problem solving skills.
2	Learn the Bridge substructures and superstructures
3	Summarize the principles of design and detailing of bridges
4	Analyse and Design different types of Bridges.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit.

• Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	"Essentials of Bridge Engineering"- D Johnson Victor, Oxford & IBH Publishing Co New Delhi
2	"Design of Bridges"- N Krishna Raju, Oxford & IBH Publishing Co New Delhi
3	"Principles and Practice of Bridge Engineering"- S P Bindra Dhanpat Rai & Sons New Delhi
4	IRC 6 – 1966 "Standard Specifications And Code Of Practice For Road Bridges"- Section II Loads and Stresses, The Indian Road Congress New Delhi
5	IRC 21 – 1966 "Standard Specifications And Code Of Practice For Road Bridges"-Section III Cement Concrete (Plain and reinforced) The Indian Road Congress New Delhi
6	IS 456 – 2000 "Indian Standard Plain and Reinforced Concrete Code of Practice"- (Fourth Revision) BIS New Delhi
7	IS 1343 – "Indian Standard Prestressed Concrete Code of Practice"- BIS New Delhi

Reference Books:	
1	Raina V.K., "Concrete Bridge Practice"- Tata McGraw Hill
2	Bakht B & Jaeggar, "Bridge Analysis Simplified"- McGraw Hill
3	Ponnuswamy. S, "Bridge Engineering"- Tata McGraw Hill.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	✓	-	-	-	-
CO2	✓	-	-	-	-	✓
CO3	✓	-	--	-	-	-
CO4	✓	✓	✓	-	-	-

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: DESIGN OF INDUSTRIAL STRUCTURES	
Course Code: **18CSE321**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To make students to learn principles of Design of industrial building.
2	To design different components of industrial structures and to detail the structures.
3	To evaluate the performance of the Pre-engineered buildings.

UNIT – I	
Analysis of industrial building for Gravity and Wind load. Analysis and design of framing components namely, girders, trusses, gable frames	**12 Hrs**
UNIT – II	
Analysis and design of gantry column (stepped column / column with bracket), purlins, girts, bracings including all connections.	**10 Hrs**
UNIT – III	
Analysis of transmission line towers for wind load and design of towers including all connections.	**10 Hrs**
UNIT – IV	
Forms of light gauge sections, Effective width computation of unstiffened, stiffened, multiple stiffened compression elements of cold formed light gauge sections. Concept of local buckling of thin elements. Limiting width to thickness ratio. Post buckling strength.	**10 Hrs**
UNIT – V (Blended learning)	
Concept of Pre-engineered buildings, Design of compression and tension members of cold formed light gauge sections, Design of flexural members (Laterally restrained/laterally unrestrained).	**10 Hrs**

Course Outcomes: The students will be able to	
1	Design the components of industrial buildings.
2	Design the components of transmission towers
3	Understand the use of light gauge sections
4	To evaluate the performance of Pre-engineered buildings

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books	
1	Jurgen Axel Adam, Katharria Hausmann, Frank Juttner, Klauss Daniel, Industrial Buildings: A Design Manual, Birkhauser Publishers, 2004.
2	B.C. Punmia, A.K. Jain "Design of Steel Structures", Laxmi Publications, New Delhi**.**

Reference Books:	
1	Santhakumar A.R. and Murthy S.S., Transmission Line Structures, Tata McGraw Hill, 1992.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	✓	-	-	-	-

CO2	✓	✓	✓	-	-	-
CO3	✓	✓	-	-	-	-
CO4	✓	✓	-	-	-	-

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: THEORY OF PLASTICITY AND FRACTURE MECHANICS	
Course Code: **18CSE322**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To compute the stress intensity factor, strain energy release rate, and the stress and strain fields around a crack tip for linear and nonlinear materials
2	Know experimental methods to determine the fracture toughness
3	Use the design principle of materials and structures using fracture mechanics approaches

UNIT – I	
Plasticity General concept, yield criteria, flow rules for perfectly plastic and strain hardening materials-simple applications, Theories of failure. Plasticity models for concrete	**12 Hrs**
UNIT – II	
Linear Elastic Fracture mechanics Basic modes of fracture, Griffith theory of brittle fracture, Irwin's modifications for elastic-plastic materials, theories of linear elastic fracture mechanics, stress intensity factors, fracture toughness testing.	**10 Hrs**
UNIT – III	
Elasto-plastic fracture mechanics Crack-tip plasticity and in metals. Mixed mode problems and evaluation of critical fracture parameters.	**10 Hrs**
UNIT – IV	
Fatigue damage theories Fatigue test, endurance limit, fatigue fracture under combined loading, fatigue controlling factors, cumulative fatigue damage concepts.	**10 Hrs**
UNIT – V (Blended learning)	
Fracture of Concrete Review of concrete behaviour in tension and compression, Basic frame works for modelling of quasi-brittle materials, discrete crack concept/Smeared crack concept. FE Concepts and applications.	**10 Hrs**

Course Outcomes: The students will be able to	
1	Explain and apply yield criteria & flow
2	Design structures using fracture mechanics approaches
3	Apply principles of fracture mechanics
4	Solve problems related to plastic fracture mechanics

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books	
1	Prashant Kumar, "Elements of Fracture Mechanics", Tata McGraw Hill, NewDelhi, India, 2009.

Reference Books:	
1	Valliappan S. "Continuum Mechanics Fundamentals" (1982), Oxford IBH, N D. New Delhi.

2	Broek, D., "Elementary Engineering Fracture Mechanics", 4th edition, MartinusNijhoff (1987).
3	Venkataraman and Patel “Structural Mechanics with introduction to Elasticity and Plasticity” – Mcgraw Hill, 1990.
4	Simha K.R.Y., “Fracture Mechanics for Modern Engineering Design”,Universities Press (India) Limited, 2001.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	-	-	-	-
CO2	✓	✓	-	-	-	✓
CO3	✓	✓	-	-	-	✓
CO4	✓	✓	-	-	-	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: MASONRY STRUCTURES	
Course Code: **18CSE323**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To know different terminologies related to masonry design and construction, codes used for design.
2	To understand guidelines governing for masonry design is studied
3	To understand properties of masonry units, strength and factors affecting strength.
4	To gain knowledge and understand design criteria of various types of wall subjected to different load system.

UNIT – I	
Introduction, Masonry units, materials and types: History of masonry Characteristics of Brick, stone, clay block, concrete block, stabilized mud block masonry units – strength, modulus of elasticity and water absorption. Masonry materials – Classification and properties of mortars, selection of mortars.	**10 Hrs**
UNIT – II	
Strength of Masonry in Compression: Behaviour of Masonry under compression, strength and elastic properties, influence of masonry unit and mortar characteristics, effect of masonry unit height on compressive strength, prediction of strength of masonry in Indian context, Failure theories of masonry under compression. Effects of slenderness and eccentricity, effect of rate of absorption, effect of curing, effect of ageing, workmanship on compressive strength.	**10 Hrs**
UNIT – III	
Flexural and shear bond, flexural strength and shear strength: Bond between masonry unit and mortar, tests for determining flexural and shear bond strengths, factors affecting bond strength, effect of bond strength on compressive strength, shear strength of masonry, test procedures for evaluating flexural and shear strength.	**10 Hrs**
UNIT – IV	
Design of load bearing masonry buildings: Permissible compressive stress, stress reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses, Effective height of walls and columns, opening in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action, lintels; Wall carrying axial load, eccentric load with different eccentricity ratios, wall with openings, freestanding wall; Design of load bearing masonry for buildings up to 3 to 8 storeys using BIS codal provisions.	**12 Hrs**
UNIT – V (Blended learning)	
Earthquake resistant masonry buildings: Behaviour of masonry during earthquakes, concepts and design procedure for earthquake resistant masonry, BIS codal provisions. Masonry arches, domes and vaults: Components and classification of masonry arches, domes and vaults, historical buildings, construction procedure.	**8** Hrs

Course Outcomes:	
1	Define different masonry units, mortars and factors influencing masonry strength.
2	Understand the concept of structural masonry, failure theories, strength under compression and behaviour of masonry during earthquake.
3	Apply codal provision for design of load bearing masonry building.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks.

- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Dayaratnam P, “Brick and Reinforced Brick Structures”, Scientific International Pvt. Ltd.
2	M. L. Gambhir, “Building and Construction Materials”, McGraw Hill education Pvt. Ltd.
3	Brick and Reinforced Brick Structures- Dayaratnam P: Oxford & IBH, 1987.
4	Alternative Building Materials Technology -Jagadish K.S., 2008, New Age International.

Reference Books:	
1	Structural Masonry - Henry, A.W: Macmillan Education Ltd., 1990.
2	Design of Masonry Structures- Sinha B.P, Davies S.R: E & FN spon 1997
3	IS 1905–1987 Code of practice for structural use of un-reinforced masonry- BIS, New Delhi.
4	SP20(S&T)–1991, “Hand book on masonry design and construction (1st revision) BIS, New Delhi.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	-	✓	-	-
CO2	-	-	✓	-	-	✓
CO3	✓	-	-	✓	✓	-

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: OPTIMIZATION TECHNIQUES	
Course Code: **18CSE331**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To make students learn principles of optimization.
2	To implement the optimization concepts for the structural engineering problems..
3	To evaluate different methods of optimization.

UNIT – I	
Introduction: Introduction to optimization, engineering applications of optimization, Formulation of structural optimization problems as programming problems. **Optimization Techniques**: Classical optimization techniques, single variable optimization, multivariable optimization with no constraints, unconstrained minimization techniques and algorithms constrained optimization solutions by penalty function techniques, Lagrange multipliers techniques and feasibility techniques.	**12 Hrs**
UNIT – II	
Linear Programming: Linear programming, standard form of linear programming, geometry of linear programming problems, solution of a system of linear simultaneous equations, pivotal production of general systems of equations, simplex algorithms, revised simpler methods, duality in linear programming.	**10 Hrs**
UNIT – III	
Non-linear programming: Non-linear programming, one dimensional minimization methods, elimination methods, Fibonacci method, golden section method, interpolation methods, quadratic and cubic methods, Unconstrained optimization methods, direct search methods, random search methods, descent methods.	**10 Hrs**
UNIT – IV	
Constrained optimization: Techniques such as direct methods, the complex methods, cutting plane method, exterior penalty function methods for structural engineering problems. Formulation and solution of structural optimization problems by different techniques.	**10 Hrs**
UNIT – V (Blended learning)	
Geometric programming: Geometric programming, conversion of NLP as a sequence of LP/ Geometric programming. **Dynamic programming:** Dynamic programming conversion of NLP as a sequence of LP/ Dynamic programming.	**10 Hrs**

Course Outcomes: The students will be able to	
1	Understand the principles of optimization and its techniques.
2	Summarize the Linear, Non-linear and Geometric Programming,
3	Ability to apply the knowledge of different programming models for structural optimization.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Singiresu S. Rao,(2010), “Engineering Optimization (Theory and Practice)” 3rd Edition, New Age International (P) Ltd.
2	Rao S.S.,(1983), “Engineering Optimization-Theory and Applications”, New Age International Publishers
3	Bhavikatti S.S.- “Structural optimization using sequential linear programming”- Vikas publishing house
4	Richard Bronson, “Operation Research”- Schaum’s Outline Series

Reference Books:	
1	Jack R. Benjamin & C. Allin Cornell., (2014), “Probability, Statistics and Decision for Engineers”, McGrawHill.
2	Spunt, “Optimum Structural Design”- Prentice Hall
3	Kirsch U., (1981) “Optimum Structural Design”, McGraw Hill

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	✓	-	-	-
CO2	-	✓	-	✓	-	-
CO3	✓	-	-	✓	-	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: COMPOSITES AND SMART MATERIALS	
Course Code: **18CSE332**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To make students to learn principles of Composite materials.
2	To characterize smart materials.
3	To identify and understand the actuators and sensors.

UNIT – I	
Introduction: Introduction to Composite materials, classifications and applications. Anisotropic elasticity – unidirectional and anisotropic lamina, thermo–mechanical properties, micro-mechanical analysis, characterization tests.	**12 Hrs**
UNIT – II	
Classical composite lamination theory, cross and angle – play lamina, symmetric, anti-symmetric and general symmetric laminates, mechanical coupling. Analysis of simple laminated structural elements ply-stress and strain, lamina failure theories First fly failure, vibration and buckling analysis. Sandwich structure face and core materials, secondary failure modes environmental effects, manufacturing of composites.	**10 Hrs**
UNIT – III	
Introduction to smart materials and structures – piezoelectric materials – coupled electromechanical constitutive relations – depoling and coercive field – field – strain relation – hysterics – creep – strain rate effects – manufacturing.	**10 Hrs**
UNIT – IV	
Actuators and sensors: single and dual actuators – pure extension, pure bending – bending extension relations – uniform strain beam model – symmetric induced strain actuators – bond shearing force – Bernoulli Euler (BE) beam model – embedded actuators.	**10 Hrs**
UNIT – V (Blended learning)	
Asymmetric induced strain actuators in uniform strain and Euler – Bernoulli models. Uniform strain model – energy principle formulation – BE model – single and dual surface bonded actuators – Extension – bending and torsion model. Introductions to control systems: Open loop and close loop transfer functions – stability criteria – deflection control of beam like structures – using piezoelectric sensors and actuators – shape memory alloys.	**10 Hrs**

Course Outcomes:	
1	Classify Composite materials and smart materials with its applications in structural elements.
2	Understand the behaviour of Actuators and sensors.
3	Apply the knowledge of control systems in structural elements.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Mechanics of Composite Materials and Structures by M. Mukhopadhya- Universities Press 2009
2	Robart M.Jones, “Mechanical of Composite Materials”- McGraw Hill Publishing Co.
3	Bhagwan D Agarvalm, and Lawrence J Brutman, “Analysis and Performance of Fiber Composites”- John Willy and Sons.

Reference Books:	
1	Crawley, E and de Luis, J., "Use of Piezoelectric actuators as elements of intelligent structures"- AIAA Journal, Vol.25, No.10, Oct 1987, PP 1373-1385
2	Crawley, E and Anderson, E., "Detailed models of Piezoceramic actuation of beams" - Proc. of the 30th AIAA/ASME/ASME/ASCE/AHS/ASC – Structural dynamics and material conference, AIAA, Washington DC, 1989

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	✓	-	-	-
CO2	-	✓	✓	-	-	-
CO3	✓	-	-	✓	✓	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: ADVANCED STRUCTURAL MECHANICS	
Course Code: **18CSE333**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52Hrs (L:T:P:S:4:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	To make students to acquaint with the principles of structural mechanics to solve Civil/Structural Engineering problems.
2	To make students to acquaint with the principles of Plastic analysis of structures.
3	To make students to acquaint with the lateral load analysis.

UNIT – I	
Influence Line Diagram for Indeterminate Structures(ILD): Muller Breslau principle for determinate and indeterminate structures, Influence lines for bending moment and shear forces in continuous beams.	**12 Hrs**
UNIT – II	
Kani's Rotation Contribution method for unsymmetrical frames: Kani's method for the analysis of symmetric and asymmetric frames.	**10 Hrs**
UNIT – III	
Plastic Analysis of Structures: Basic principles and advantages. plastic moment, plastic hinge, shape factors and computation of shape factors for different cross sectional shapes, Plastic collapse, mechanism conditions, types of mechanisms, combined/composite mechanisms, theorems, applications to the analysis of simple and continuous beams	**10 Hrs**
UNIT – IV	
Plastic Analysis of Frames and Gable Structures and Plastic Design: Combined / Composite mechanisms and plastic analysis of frames, Instantaneous centre of rotation, minimum weight design, plastic design of beams and frames.	**10 Hrs**
UNIT – V (Blended learning)	
Analysis of Building Frames for Vertical and Lateral Loads Analysis of frames subjected to horizontal/lateral loads: portal method, cantilever method, and factor method, Substitute frame method of analysis/two cycle moment distribution for vertical loads.	**10 Hrs**

Course Outcomes: The students will be able to	
1	Understand the principles of influence lines for calculation of moments and forces.
2	Perform analysis of frames by Kani's method.
3	Perform Plastic analysis and design of structures.
4	Analyze the structures subjected to different types of vertical and lateral loadings.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books	
1	Reddy C.S, Basic Structural Analysis, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1997.
2	Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineers, Tata McGraw Hill Edition, New Delhi, Third Edition, 2000, ISBN 0-07-042139-0.

3	N. Krishnaraju and K.U. Muthu, Numerical Methods for Engineering Problems, MACMILLAN India Ltd., 1992, SBN 033390-973-9.

Reference Books:	
1	Wang C.K, Intermediate Structural Analysis, McGraw Hill Publishing Co., USA, 1983.
2	Pandit G.S and Gupta S.P, Structural Analysis, Tata McGraw Hill, New Delhi, 2001.
3	Rajasekaran S and Sankarasubramanian G, Computational Structural Mechanics, Prentice Hall of India, New Delhi, 2001.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	✓	-	-	-	-
CO2	✓	-	-	-	-	-
CO3	✓	✓	-	-	-	✓
CO4	✓	-	-	-	-	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: EARTH AND EARTH RETAINING STRUCTURES	
Course Code: **18CSE334**	CIE + Assignment + Group Activity + Seminar + SEE Marks = 30 + 10 + 5 + 5 + 100
Credits: 03	
Hours: 52 Hrs. (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs.

Course Learning Objectives:	
1	Broadly familiar with the importance of geotechnical engineering problems related field.
2	Understand the types of lateral earth pressure and its use in the design of retaining structures.
3	Check the stability of earthen slopes, retaining walls, sheet piles and braced cuts.
4	Estimation of seepage quantity through earthen dams and sheet piles.

UNIT – I	
STABILITY OF EARTH SLOPES: Types of slopes, causes and type of failure of slopes. Factor of safety, Stability analysis of Infinite slopes by limiting equillbrium condition, Stability analysis of finite slopes by Swedish slip circle method, Method of slices, Fellineous method, Taylor's stability number. Stability of slopes under steady seepage, sudden drawdown and during construction.	**8 Hrs**
UNIT – II (Blended learning)	
SEEPAGE ANALYSIS: Laplace equation, Flow nets – characteristics and applications, Flow nets for sheet piles and below dam. Phreatic line – A. Casagrande's method – with and without filter, Flow through dams, Design of dam filters.	**9 Hrs**
UNIT – III	
LATERAL EARTH PRESSURE: Types of earth pressure (Active, Passive and at-rest earth pressure). Rankine's and Coulomb's Earth pressure theories – Assumptions and limitations. Rankine's theory of applications (Dry, moist, submerged, partially submerged, uniform surcharge, layered cohesionless, cohesive and cohesive – friction backfill).	**7 Hrs**
UNIT – IV	
RETAINING WALLS: Types of retaining walls, Failure of retaining walls by sliding, overturning and bearing. Stability and principles of the design of retaining walls – Gravity retaining walls, cantilever retaining walls, counterfort retaining walls, modes of failure of retaining walls, drainage of the backfill.	**8 Hrs**
UNIT – V	
BULK HEADS: Cantilever sheet pile walls and Anchored cantilever sheet pile walls in cohesion less soils and in clay. **BRACED CUTS:** Lateral earth pressure on sheeting and Design of various components of bracings.	**7 Hrs**

Course Outcomes: The students will be able to	
1	Estimate the factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures.
2	Estimate the quantity of seepage through earth retaining structures.
3	Analyse and design the various components and check the safety of retaining wall, sheet pile and braced cut.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit.

• The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Soil Mechanics and Foundation Engineering, Punmia B C, Laxmi Publications Co., New Delhi.
2	Basic and Applied Soil Mechanics - Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., New Delhi.
3	Geotechnical Engineering - Braja, M. Das (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India
4	Principles of Soil Mechanics and Foundation Engineering- Murthy V.N.S. (1996), 4th Edition, UBS Publishers and Distributors, New Delhi.

Reference Books:	
1	Bowles J E, Foundation analysis and design, McGraw- Hill Publications
2	Shashi K. Gulathi & Manoj Datta, Geotechnical Engineering, Tata McGraw Hill Publications
3	T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley & Sons.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	-	✓	-	-
CO2	-	-	✓	-	-	-
CO3	-	✓	-	-	✓	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: INTERNSHIP	
Course Code: **20CSEI34**	
Credits:08	
Hours: (L:T:P:S:0:0:16:0)	

Course Learning Objectives:	
1	Ability to expose to a particular job and a profession or industry.
2	Explore career alternatives prior to graduation.
3	Develop business skills in communication, technology and team work.

The student shall make a midterm presentation of the activities undertaken during the first 8 weeks of internship to a panel comprising Internship Guide, a senior faculty from the department and Head of the Department. The Department shall facilitate and monitor the student internship program. **The internship report of each student shall be submitted to the Institute.**

Course Outcomes: The students will be able to	
1	Build a record of work experience.
2	Develop work habits and attitudes necessary for job success.
3	Acquire employment contacts leading directly to a full time job following graduation from college.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	-	-	✓	✓
CO2	✓	-	✓	-	✓	-
CO3	-	-	✓	✓	-	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: TECHNICAL SEMINAR	
Course Code: **20CSES35**	
Credits: 02	
Hours: (L:T:P:S:0:4:0:0)	

Course Learning Objectives:	
1	To enhance the self-learning capacity of students.
2	Enable them to make a comprehensive approach to new and upcoming areas of technology.
3	Also to impart training to students to face audience and present their ideas and thus creating in them self-esteem and courage.

Individual students are required to choose a topic of their interest from Structural Engineering related topics preferably from outside the M.Tech syllabus. And give a seminar on that topic about 45 minutes. A committee consisting of at least three faculty members (preferably specialized in Structural Engineering) shall assess the presentation of the seminar and award marks to the students based on merits of topic of presentation. Each student shall submit two copies of a write up of his seminar topic. One copy shall be returned to the student after duly certifying it by the chairman of the assessing committee and the other will be kept in the departmental library. Internal continuous assessment marks are awarded based on the relevance of the topic, presentation skill, quality of the report and participation and Simulations.

Reading Materials	
1	Journal Publication.
2	Conference / Seminar Proceedings.
3	Handbooks / Research Digests/Codebooks

Course Outcomes: The students will be able to	
1	Identify and chose appropriate topic of relevance.
2	Assimilate literature on technical articles of specified topic and develop comprehension
3	Write technical report.
4	Design and develop presentation on a given technical topic.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	✓	-	-	-	✓
CO2	-	✓	✓	-	-	-
CO3	-	✓	-	-	✓	-
CO4	-	-	-	✓	✓	✓

Syllabus for 2020-21 Batch PG (CSE)

Semester: III	
Course Title: PROJECT PHASE I	
Course Code: **20CSEP36**	
Credits: 02	
Hours: (L:T:P:S:0:0:12:0)	

Course Learning Objectives:	
1	To improve the professional competency and research aptitude by touching the specific areas which otherwise not covered by theory or laboratory classes.
2	The project work aims to develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry/field and current research.

The project work can be analysis and design projects of innovative nature or experimental investigation or numerical simulations or a combination of these. Appropriate software developments with sufficient literature contributions can also be taken up. Each student will be allotted with a faculty as guide. In specific cases student may consult with an external guide with the prior consents of internal guide and head of the department. In this semester, students are expected to finalize appropriate topic of research, complete the required literature survey and about 25% of the objectives of their intended research.

Reading Materials	
1	Journal Publication.
2	Conference / Seminar Proceedings.
3	Handbooks / Research Digests/Codebooks

Course Outcomes: The students will be able to	
1	Identify and chose appropriate topic of relevance.
2	Critically evaluate literature in chosen area of research & Establish Scope of work.
3	Define Research Problem Statement.

CO-PO Mapping						
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	✓	-	✓	-	✓	✓
CO2	-	✓	✓	✓	-	✓
CO3	✓	✓	-	✓	-	✓