VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS FOR BE 3/4 - FIRST SEMESTER

REINFORCED CONCRETE DESIGN –I

Instruction	: 4+2 Periods per week	Sem. Exam Marks	: 70	Subject Ref. Code	: CE 3010
Credits	: 4	Sessional Marks	: 30	Duration of Sem. Exam	: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of this course students will be expected to*
1. Design philosophies of working stress method and limit state method. 2. Indian standard codes of practice for Reinforced Concrete 3. Design of concrete structural elements using limit state method as per Indian code of practice.	1. Understand properties of constituent materials of concrete. 2. Design beams for flexure with working stress method according to IS: 456-2000. 3. Design beams for flexure, shear and torsion and compute deflections with limit state design philosophy according to IS: 456-2000. 4. Perform yield line analysis of slabs and design slabs according to IS: 456-2000. 5. Design columns and footings with limit state method according to IS: 456-2000.

UNIT-I :

Introduction to Reinforced Cement Concrete: Need for Reinforcement in Concrete – Basic requirements of an RCC Structure- stability, strength, serviceability and durability.

Design Philosophies: Design philosophies- Working stress method (WSM) and limit state method (LSM) relative merits and demerits.

Working stress method: Theory of flexure in RCC beams, Balanced, under-reinforced and over reinforced sections; Analysis and design of singly and doubly reinforced rectangular and flanged sections.

UNIT-II :

Basic concepts and terminology of LSM: Basic concepts and terminology of LSM - limit state, characteristic loads and strengths, Partial safety factors. Stress strain relationship for concrete and reinforcing steel; stress blocks.

Limit State of collapse in flexure: Assumptions, Analysis for flexure, failure in tension and compression, singly reinforced, doubly reinforced rectangular and flanged beams. Anchorage and development length, Curtailment of reinforcement in beams.

UNIT-III :

Limit State of collapse in shear and torsion: Analysis and design for shear and torsion.

Limit State of Serviceability: Check for deflection and cracking.

UNIT-IV :

Analysis and design of slabs: Types of slabs-one way, two way simply supported and continuous rectangular slabs subjected to uniformly distributed loads. Design of solid rectangular slabs.

Introduction to Yield line Theory for Slabs: Assumptions – Patterns of Yield lines – Analysis and design of a simply supported rectangular two- way slab using yield line approach.

UNIT-V :

Analysis and design of columns: Assumptions, axially loaded circular, square and rectangular columns, Uniaxial and biaxial bending- interaction diagrams.

Design of Footings: Design of isolated square and rectangular footings as per IS code.

Learning Resources :

1. Unnikrishna Pillai S and Devdas Menon, "Reinforced Concrete Design", McGraw Hill Education India Pvt Ltd.,2009.
2. Varghese P.C, "Limit State Design of Reinforced Concrete", Prentice Hall of India, 2008.
3. Subramanian N., "Design of Reinforced Concrete Structures", Oxford University Press, 2013.
4. Shah H.J., "Reinforced Concrete", Vol.1, Charotar Publishing House, 2012.
5. Punmia B.C., Ashok K. Jain, Arun K. Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications (P) Ltd. , 2012.
6. Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co., 2015.
7. Nptel.ac.in/courses/105105105, Design of Reinforced Concrete Structures.
8. IS:456-2000, Code of Practice for Plain and Reinforced concrete, Bureau of Indian Standards, New Delhi, India.
9. SP 16: Design Aids for Reinforced Concrete to IS 456:1978, Bureau of Indian Standards, New Delhi, India
10. SP 24: Explanatory Handbook on Indian Standard Code of Practice for Plain and Reinforced Concrete to IS 456:1978, Bureau of Indian Standards, New Delhi, India
11. SP 34: Handbook on Concrete Reinforcement and Detailing (With Amendment 1), Bureau of Indian Standards, New Delhi, India
12. IS: 875-1987 Code of Practice For Design Loads (Other Than Earthquake) For Buildings And Structures Parts (1, 2, 3, 4 & 5), Bureau of Indian Standards, New Delhi, India

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE 3/4 - FIRST SEMESTER
FLUID MECHANICS-II

Instruction	: 4 Periods per week	Sem Exam Marks	: 70	Subject Reference Code	: CE 3020
Credits	: 3	Sessional Marks	: 30	Duration of Sem Exam	: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. To study various aspects of open channel flow. 2. To learn the concepts of boundary layer theory, dimensional analysis and model studies. 3. To discuss the performance and design of hydraulic turbines and centrifugal pump.	1. Determine velocity and pressure distributions in flow system. 2. Compute water surface profiles and its characteristics and description of hydraulic jump and surges. 3. Explain various aspects of boundary layer theory 4. Apply the concept of dimensional analysis and model studies. 5. Evaluate the performance of hydraulic turbines, centrifugal pump and their design.

UNIT-I :

Steady uniform flow through open channels: Descriptions and definitions, difference between pipe flow and channel flow, velocity and pressure distributions in channel cross section, energy and momentum correction coefficients, friction to flow in open channels, uniform flow, Manning's and Chezy's formulae, most efficient channel cross-section, specific energy, concept and applications of critical depth.

UNIT-II :

Gradually varied flow: Significance of Froude Number, dynamic equation of gradually varied flow, classification of gradually varied flow profiles, computation of flow profiles and characteristics of flow profiles. Hydraulic Jump-Momentum equation for a jump in horizontal rectangular channel, energy dissipation in hydraulic jumps and surges in open channels, elementary surge analysis.

UNIT-III :

Boundary layer: Boundary layer growth and separation, methods to control separation, drag and lift forces, Principle of stream lining. Displacement, energy & momentum thickness and stream lined body and bluff body.

UNIT-IV :

Dimensional Analysis and Models Studies: Dimensional analysis as a tool in experimental hydraulics, Buckingham's pi-theorem, applications, geometric, Kinematics and dynamic similarity, similarity laws; significance of Reynold's, Froude and Mach Numbers, Different types of models and their scale ratios.

UNIT-V :

Hydraulic Turbines: Classification, specific speed, unit quantities velocity triangles and principles of design of pelton wheel turbine, Francis turbine and Kaplan turbine, characteristics curves.

Centrifugal Pumps: Component, work done and efficiency, minimum starting speed, specific speed and characteristics curves of centrifugal pumps.

Learning Resources :

1. Modi P.N., Seth S.M., "Fluid Mechanics", Standard Book House, 2013
2. Bansal R.K., "Fluid Mechanics & Hydraulic Machinery", Laxmi Publications, 2015
3. Som S.K. and Biswas G., "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw-Hill Publications,2012.
4. Subramanya K., "1000 Solved Problems in Fluid Mechanics", Tata McGraw-Hill Publications 2005.
5. Ojha C.S.P., Brendtsson R., Chandramouli P.N., "Fluid Mechanics and Machinery", Oxford University Press, 2010.
6. Subramanya K., "Flow in Open Channels", Tata McGraw-Hill Publications, 2009.
7. Victor L Streeter, Benjamin E Wylie, Bedford K.W., "Fluid Mechanics", McGraw Hill Education, 2010.

ONLINE RESOURCES

8. http://nptel.ac.in/courses/105107059/, Fluid Mechanics
9. http://nptel.ac.in/courses/105103096/3, Hydraulics

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE 3/4 - FIRST SEMESTER
THEORY OF STRUCTURES-I

Instruction	: 4+2 Periods per week	Sem. End Exam Marks	: 70	Subject Reference Code	: CE 3030
Credits	: 4	Sessional Marks	: 30	Duration of Semester End Exam	: 3 Hrs.

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Explain methods of analysis for indeterminate beams, portal frames, arches and trusses 2. Describe analysis of beams and pin jointed frames using strain energy methods 3. Explain approximate methods of analysis for lateral loads	1. Find degree of indeterminacy of any structure and to analyse continuous beams and frames using 'moment distribution method' 2. Analysis of beams and frames using 'slope deflection method' 3. Analyse indeterminate structures using Kani's method and draw shear force and bending moment diagrams 4. Analysis of three hinged and two hinged parabolic arches and analysis of frames for lateral loads 5. Apply strain energy methods in the analysis of beams and pin jointed trusses

UNIT-I :

Static and Kinematic indeterminacy: Determination of static and kinematic indeterminacy of beams, pin jointed and rigid jointed frames.

Moment distribution method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-II :

Slope deflection method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-III :

Kani's method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-IV :

Analysis of arches: Three hinged and two hinged parabolic arches, determination of horizontal thrust, bending moment, normal thrust and radial shear for static loading.

Analysis for Lateral loads: Portal method and cantilever method.

UNIT-V :

Strain energy methods: Determination of displacements using unit load method for statically determinate structures such as beams, pin-jointed trusses.

Redundant pin jointed trusses: Analysis of plane trusses with one of degree of redundancy (internal / external), Assembly and temperature effects.

Learning Resources :

1. Vazirani V.N., Ratwani M.M, Duggal S.K., "Analysis of Structures - Vol. II Theory, Design and Details of Structures", Khanna Publishers, 16th Edition, 2015.
2. Thandavamoorthy T.S., "Structural Analysis", Oxford Higher Education, Second Edition, 2012.
3. Ramamrutham S., Narayan R., "Theory of Structures", Dhanpath Rai publications, 2014
4. Devdas Menon, "Structural Analysis", 1st Edition, Narosa Book Distributors Pvt Ltd,2014.
5. Reddy C.S., "Basic Structural Analysis", 3rd Edition, Mc Graw Hill, 2010.
6. Junarkar S.B., Shah, "Mechanics of Structures", Volume II, Charotar Pub. House, 2010.
7. Chu-Kia Wang, "Intermediate Structural Analysis (English) 1st Edition", McGraw Hill Education, 2010.
8. Hibbeler R.C., "Structural Analysis", 8/E, Prentice Hall, Higher Education, 2012.
9. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2nd Edition, Wiley India Pvt. Ltd., 2011.

10. Online Resources

1. http://nptel.ac.in/downloads/105101085/

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE 3/4 - FIRST SEMESTER
ENVIRONMENTAL ENGINEERING

Instruction	: 4 Periods per week	Sem. Exam Marks	: 70	Subject Ref. Code	: CE 3040
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam	: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Analyze water and waste water system and understand the concepts of demand, supply and distribution system and Identify various public health elements 2. State the stages involved in water treatment and their mechanism. 3. Describe the concept of domestic sewage related to quality, quantity, sewerage system, treatment and their design.	1. Assess the water quality and design the water supply network. 2. Design the components of a water treatment plant. 3. Understand various elements of domestic / industrial sewage 4. Design the components of a simple sewerage system. 5. Understand the sludge and solid waste treatment and disposal.

UNIT-I :

Introduction: Necessity of protected water supply and sanitation. Water demand and per capita consumption, factors affecting population forecasts.

Water Supply: Sources of water and quality parameters, standards of potable water, infiltration pipes & galleries, intake structures pipes, joints, valves & pumps. Water distribution systems and solution of a simple network using hardy cross method.

UNIT-II :

Treatment of Water: Clarification sedimentation – Principles. Design of sedimentation tanks, rectangular and circular sedimentation tanks, coagulation and flocculation, design of a clariflocculator. Filtration – types of filters and filter media. Design principles of slow and rapid sand filters. Backwash mechanisms. Pressure filters. Disinfections – necessity and methods, chlorination of water supplied, action of chlorine, break point chlorination. Ozone and U-V radiations, Removal of hardness, tastes & odour control

UNIT-III :

Domestic sewage: Population equivalent, quantity estimation, quality parameters – Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD). Sewerage systems, ultimate disposal of sewage. Land and water bodies. Sewage conveyance – Sewer types and appurtenances. Velocity in sewers, Design of a simple sewerage system. Storm water sewers – storm water estimation by rational method.

UNIT-IV :

Waste Water Treatment: Preliminary treatment, screens, grit chambers. Primary treatment – Secondary treatment – sewage filtration – trickling design. Activated sludge process – design parameters, secondary clarifier. Design aspects of a sewage treatment facility.

UNIT-V :

Sludge: Sludge digestion and disposal methods – septic tanks – design parameters and working principles. Low cost waste treatment – oxidation ponds, oxidation ditches.

Solid Waste: Types, source and composition of solid waste. Methods of collection, transportation and disposal

Learning Resources :

1. Birdi G.S, "Water Supply and Sanitary Engineering", Dhanpat Rai & Sons, 2014
2. Peavy H.S., Rowe D.R., Tchobanoglous G., "Environmental Engineering", Tata McGraw Hills, New Delhi, 1985
3. Punmia B.C., "Environmental Engineering Vol. I & II", Laxmi Publications Pvt Ltd., New Delhi, 2015
4. Metcalf & Eddy M.C., "Waste Water Engineering – Treatment & Reuse", Tata McGraw Hill Publications, New Delhi, 2003

Online Resources:

5. http://nptel.ac.in/courses/105106119/

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE 3/4 - FIRST SEMESTER
SOIL MECHANICS

Instruction	: 4 Periods per week	Sem. Exam Marks	: 70	Subject Ref. Code	: CE 3050
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam	: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to introduce	*Upon the completion of this course students will be expected to*
1. Origin, classification of soils and estimate index and engineering properties by different procedures 2. Concepts of compaction and consolidation of soils 3. Estimate shear strength parameters, earth pressure and analyze stability of different slopes	1. Classify and identify various types of soils. 2. Understand the concepts of permeability, effective stress and seepage in soils 3. Assess the compaction effect and consolidation settlements in soils 4. Determine shear strength of soils. 5. Calculate earth pressure and analyze stability of slopes.

UNIT-I :

Origin & Classification of Soils – Soil as a pseudo-elastic three phase particulate medium.

Physical Properties of Soils: Weight ratios (Water content, Density, Unit weights, Specific Gravity); Volume ratios (void ratio, porosity, degree of saturation, relative density); Inter-relationships. Determination of Index properties.

Capillarity in Soils: Soil moisture states, Surface tension and capillary rise in soil, Capillary tension, Capillary pressure. pF value

UNIT-II :

Permeability of Soils: Darcy's law for flow through soils - validity of Darcy's Law - Factors affecting permeability – Determination of co-efficient of permeability (constant head, variable head permeability tests) - Field tests (Pumping in and pumping out tests) - Equivalent permeability of stratified soils.

Seepage in Soils: Seepage flow, seepage pressure – Flow nets- Locating phreatic line in a homogeneous earthen dam using Kozeny's parabola – computation of seepage quantity, total, effective and neutral stress.

Quick Sand phenomena: Critical Hydraulic gradient, Remedial measures.

UNIT-III :

Compaction Process: Compaction Mechanism; factors affecting compaction. Determination of compaction characteristics - standard and modified Proctor tests - Light and Heavy compaction tests; Field surface compaction: compaction equipment, procedure, quality control.

Consolidation Process: Spring analogy - Void ratio and effective stress (e Vs logP) relationship – Terazaghi's theory of one dimensional consolidation - assumptions and derivation of one dimensional consolidation equation, computation of magnitude of settlement and time rate of settlement. California Bearing Ratio (CBR) field and laboratory test, plate load test as per IS specifications and resilient modulus.

UNIT-IV :

Shear Strength: Significance of Shear strength in soils – Mohr-Coulomb equation – shear parameters - Determination of shear strength – Direct shear test, Tri-axial compression tests (Unconsolidated Undrained (UU), Consolidated Undrained (CU) and Consolidated Drained (CD)), Un-confined compression test, Vane shear test. Factors affecting shear strength of cohesionless and cohesive soils. Determination of elastic moduli.

UNIT-V :

Earth Pressure: States of earth pressure-Active, passive, at rest condition; Rankine's theory: computation of active and passive earth pressure in cohesionless and c-φ soils; Coulomb's Wedge theory; Rehbhan's graphical solution; stability of earth retaining gravity wall.

Slope stability: Definition and classification of slopes-types of slope failures-Factors of safety with respect to cohesion, angle of shearing resistance, Height – Analysis of stability of slope using Swedish slip circle method and Taylor's stability number.

Learning Resources :

1. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2015.
2. Gopal Ranjan, Rao A.S., "Basic and Applied Soil Mechanics", Wiley Eastern Limited, third edition, 2016.
3. Venkatramaiah C., "Geo-technical Engineering", New Age Publishers, fourth edition, 2012.
4. Arora K.R., "Soil Mechanics and Foundation Engineering", Standard Publishers Distributors revised and enlarged sixth edition, 2007.
5. Scott, R.F., "Principles of Soil Mechanics", Addison Wesley, Massauchusetts,
6. Shashi K.Gulhati and Manoj Datta, "Geotechnical Engineering", Tata Mc-Graw Hill, 2005
7. Braja M. Das, Khaled Sobhan, "Principles of Geotechnical Engineering", Cengage Learning, 2014
8. IS Code: IS-2720, Methods of tests for soils.

Online Resources:

9. http://nptel.ac.in/courses/105101084/

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
FINISHING SCHOOL – III : SOFT SKILLS

Instruction: 2 Periods per week	Sessionals:15 Marks	SEM Exam Marks:35 Marks
Credits:01	SEM Exam Duration:1.5 Hrs	Subject Ref Code: HS 3110

Course Objective:	Course Outcomes
This is a foundation course and aims at enhancing employability skills in students. Students will be introduced to higher order thinking skills and problem solving on the following areas - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. The three major areas covered in this course include 1. Numerical Ability 2. Arithmetic Ability 3. General reasoning	**At the end of the course students will be able to:** • Solve questions on the above mentioned areas using short cuts and smart methods • Understand the fundamentals concepts of Aptitude skills • Perform calculations with speed and accuracy

UNIT – I : QUANTITATIVE APTITUDE - NUMERICAL ABILITY

- Numerical Ability
- Introduction to higher order thinking skills
- Speed Maths
- Number systems
- LCM & HCF

UNIT – II: QUANTITATIVE APTITUDE-ARITHMETIC ABILITY FOUNDATION

- Arithmetic Ability
- Percentage
- Profit loss and discounts
- Ratio proportions Allegations and mixtures
- Averages

UNIT – III: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED

- Arithmetic Ability
- Time speed and distance
- Time and work
- Interest calculations

UNIT – IV: REASONING ABILITY – GENERAL REASONING PART 1

- General Reasoning
- Coding decoding
- Directions
- Series completions

UNIT – V: REASONING ABILITY- GENERAL REASONING PART 2

- General Reasoning
- Analogies
- Classification
- Alphabet test
- Mathematical operations

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
FINISHING SCHOOL – III : TECHNICAL SKILLS

Instruction: 2 Periods per week	Sessionals:15 Marks	SEM Exam Marks:35 Marks
Credits:01	SEM Exam Duration: 1.5Hrs	Subject Ref Code: CE 3100

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Explain MATLAB basic environment 2. Describe creating and running m-files 3. Discuss the syntax control structures and execute related program 4. Explain matrix operations 5. Describe input/output operations	1. Understand basic MATLAB environment 2. Create and execute m-files 3. Write program using control structures 4. Perform matrix operations 5. Understand input/output operations

UNIT-I :
Introduction: MATLAB Environment, basic syntax, variables, commands, data types, operators.

UNIT-II :
User defined functions: M-files, creating and running script files.

UNIT-III :
Control Structures: for loop, while loop, nested loops, if-else, switch statement.

UNIT-IV :
Matrix Algebra: Matrix operations, addition and subtraction of matrices, transpose of a matrix, matrix multiplication, inverse of a matrix.

UNIT-V :
Controlled Input-Output: User defined input and output operations, reading and writing data from file.

Learning Resources :
Text Books:
1. Holly Moore, "MATLAB for Engineers", 3rd edition, Pearson Publication, 2012.
2. Agam Kumar Tyag, "MATLAB and Simulink for Engineers", Oxford Higher Education

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
HUMAN VALUES & PROFESSIONAL ETHICS-II

Instruction	: 2 Periods per week	Sem. Exam Marks	: 35	Subject Ref. Code	: HS 3140
Credits	: 1	Sessional Marks	: 15	Duration of Sem.Exam	: 1½ Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Get a holistic perspective of value- based education. 2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations. 3. Understand professionalism in harmony with self and society. 4. Develop ethical human conduct and professional competence. 5. Enrich their interactions with the world around, both professional and personal.	1. Gain a world view of the self, the society and the profession. 2. Make informed decisions. 3. Start exploring themselves in relation to others and their work –constantly evolving into better human beings and professionals 4. Inculcate Human values into their profession. 5. Validate their aspirations through right understanding of human relationship and see the co-relation between the human values and prevailing problems. 6. Strike a balance between physical, mental, emotional and spiritual parts their being. 7. Obtain a holistic vision about value-based education and professional ethics.

1. **Distinction between need and Greed**-Exercising the wisdom to distinguish need from greed.
2. **Rights and Responsibilities**-Educating an individual about rights and responsibilities –Safeguards-Stimulants-Social Justice-The three catalysts for deciding rights and responsibilities.
3. **Imbibing and inculcating Civic Sense and Civic-Virtues**, The true meaning of Integrity -Honesty, Humility, Openness, Transparency, Dedication, Reliability, Confidentiality, accountability, Collegiality, Sympathy, Trustworthiness, Co-operation, Courage.
    a. The moral dilemma of the Modern world, Respect for Self, Others and Work.
    b. Respect for women at the workplace.
4. **Ideal self-Real self**- How to define the ideal-idealism at various levels- is it possible to reach idealism – Man as a pilgrim on a journey to idealism.
5. **Managing Failure**-Identifying causes for failure and learning lessons-Using failure to score success-Role of self-confidence and personal ethics in coping with failure.

• Anger/ Depression • Fear • Agitation • Failure • Lethargy • Dishonesty	• Cruelty • Jealousy • Desire • Cheating • Pride • Greed • Lying

6. **Stress Management**- Identifying sources and levels of stress –Tackling stress and its associated negativity-Positive aspect of coping with stress- Some techniques to manage stress.
7. **Developing Emotional Intelligence**
   Self-Awareness
   Handling Emotions
   Motivation
   Empathy
   Social skills

Suggested Reading:

1. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. A.N Tripathy, 2003 Human values, New Age International Publishers.
3. EG Seebauer & Robert L. Berry,2000,Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
4. Mike Martin and Ronald Schinzinger "Ethics in Engineering "McGraw Hill
5. Charles E Haris, Micheal J Rabins, " Engineering Ethics "Cengage Learning
6. Caroline whitback < Ethics in Engineering Practice and Research, Cambridge University Press
7. Georgs Reynolds, Ethics in Information Technology", Cengage Learning
8. Charles D.Fleddermann, " Engineering Ethics", Pearson Education /Prentice Hall, New Jersey,2004 (Indian Reprint)

Online Resources

1. Value Education website, Http://www.universalhumanvalues.info
2. Http://www.uptu.ac.in
3. Http://www.storyofstuff.com
4. AlGore, As Inconvenient Truth, Paramount Classics ,USA
5. Charlie Chaplin, Modern Times, United Artists, USA
6. IIT Delhi, Modern Technology-The Untold story
7. Anand Gandhi, Right Here Right Now, Cyclewala production

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
HYDRAULICS & HYDRAULIC MACHINERY LAB

Instruction	: 3 Periods per week	Sem Exam Marks	: 50	Subject Ref. Code	: CE 3011
Credits	: 2	Sessional Marks	: 25	Duration of Sem. Exam	: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of course students will be expected to*
1. Manning's rugosity coefficient and super elevation in open channels. 2. Impact coefficient on different types of vanes and drag & lift forces in wind tunnel. 3. Pre and post jump depths and calculate loss of energy in hydraulic jump. 4. Familiarize with the procedures of calculating overall efficiency of different types of pumps and turbines.	1. Determine Manning's rugosity coefficient and measure super elevation in an open channel and estimate loss of energy in hydraulic jump. 2. Evaluate impact coefficient for different types of vanes. 3. Evaluate the overall efficiency of various pumps and turbines and draw performance characteristic curves. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

1	Open Channel coefficient	Determination of Manning's rugosity coefficient
2	Open Channel Bend	Determination of super elevation
3	Impact of Jets	Determination of vane coefficient on different types of vanes
4	Centrifugal pump	Determination of efficiency and performance characteristics.
5	Centrifugal pump test rig	Determination of efficiency and performance Characteristics under varying loads
6	Pelton Wheel Turbine	Determination of efficiency and Performance characteristics
7	Francis Turbine	Determination of efficiency and Performance characteristics
8	Kaplan Turbine	Determination of efficiency and Performance characteristics
9	Self priming pump	Determination of efficiency and performance characteristics
10	Wind tunnel	a) To study Drag & Lift characteristic of different angles of attack and find coefficient of drag and lift b) Study pressure distribution over an aerofoil
11	Hydraulic Jump	Determination of pre and post jump depth in channel flow

Virtual Lab: http://eerc03-iiith.virtual-labs.ac.in/ index.php? section=List% 20of%20experiments

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
SOIL MECHANICS LAB

Instruction	: 3 Periods per week	Sem. Exam Marks	: 50	Subject Reference Code	: CE 3021
Credits	: 2	Sessional Marks	: 25	Duration of Sem Exam	: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to introduce 1. Index and engineering properties of various soils 2. Field test procedures	*Upon the completion of this course students will be expected to* 1. Determine the index properties of soils and classify soils. 2. Determine Direct shear strength and Triaxial shear strength of a soil sample 3. Calculate Permeability and determine the compaction characteristics of soils 4. Practice working as a team member and lead a team 5. Demonstrate professional behavior in conducting the experiments and presenting the results effectively.

LIST OF EXPERIMENTS

DETERMINATION OF INDEX PROPERTIES:

1. Determination of Specific Gravity of soil solids using "Density bottle" method.
2. Determination of Specific Gravity of soil solids using "Pycnometer" method.
3. Determination of water content using "Pycnometer" method.
4. Determination of Liquid limit using Casgrande's standard LL device.
5. Determination of Liquid limit using Cone Penetration apparatus.
6. Determination of Shrinkage limit
7. Determination of Plastic limit
8. Sieve Analysis for plotting Particle size distribution curve
9. Determination of Field Density using Core cutter Method
10. Determination of Field Density using Sand Replacement Method

DETERMINATION OF ENGINEERING PROPERTIES

11. Determination of Compaction Characteristics by Standard Proctor test
12. Determination of Laboratory California Bearing Ratio (CBR) value
13. Determination of Co-efficient of Permeability by "Constant Head Permeameter test"
14. Determination of Co-efficient of Permeability by "Variable Head Permeameter test"
15. Determination of shear strength parameters by "Direct Shear Test"
16. Determination of Shear Strength of Cohesive soils by "Unconfined Compression Test"
17. Determination of Shear Strength by conducting "Triaxial Shear Test"

DEMONSTRATION OF TEST PROCEDURES:

18. Standard Penetration Test
19. Consolidometer

References: 1. http://eerc02-iiith.virtual-labs.ac.in/
2. http://home.iitk.ac.in/~madhav/geolab.html

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF CIVIL ENGINEERING
CONCRETE LAB
SYLLABUS FOR BE 3/4 - FIRST SEMESTER

Instruction	: 3 Periods per week	Semester End Exam Marks	: 50	Subject Reference Code	: CE 3031
Credits	: 2	Sessional Marks	: 25	Duration of Semester End Exam	: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Determine the physical properties of cement, fine aggregate and coarse aggregate 2. Determine workability of concrete 3. Determine the strength of concrete using destructive and non-destructive methods	*Upon the completion of this course students will be expected to* 1. Determine the physical properties of cement, fine aggregate and coarse aggregate 2. Determine the workability of concrete 3. Determine the compressive strength using destructive and non-destructive methods and flexural strength by destructive method. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

I. TESTS ON CEMENT:

1. (a) Specific gravity of cement.
   (b) Unit weight or bulk density of cement.
2. Normal consistency of cement.
3. (a) Initial setting time of cement.
   (b) Final setting time of cement.
   (c) Fineness of cement by sieving.
4. Compressive strength of cement.

II. TESTS ON AGGREGATE:

5. Silt content of sand.
6. (a) Specific gravity of fine aggregate.
   (b) Bulk density of fine aggregate.
7. (a) Specific gravity of coarse aggregate.
   (b) Bulk density of coarse aggregate.
8. Bulking of sand by laboratory method.
9. Bulking of sand by field method.
10. Fineness modulus of fine aggregate.
11. Fineness modulus of coarse aggregate.

III. TESTS ON CONCRETE:

12. Workability of concrete by slump test.
13. Workability of concrete by compacting factor test.
14. Compressive strength of concrete.
15. Flexural strength of concrete.

IV. EXPERIMENTS FOR DEMONSTRATION ONLY:

16. Fineness of cement by Blain's air permeability method.
17. Non-Destructive Testing of Concrete Structures.
18. Workability of concrete by Flow test.
19. Workability of concrete by Vee-Bee test.

References:

1. IS: 269-1989, Indian Standard Code of Practice for Ordinary Portland Cement, 33 Grade – Specifications (Fourth Revision), Bureau of Indian Standards, New Delhi
2. IS: 8112-1989, Indian Standard Code of Practice for 43 Grade Ordinary Portland Cement – Specifications (First Revision), Bureau of Indian Standards, New Delhi
3. IS: 12269-1987, Indian Standard Code of Practice for Ordinary Portland Cement, 53 Grade – Specifications, Bureau of Indian Standards, New Delhi
4. IS: 650-1991, Indian Standard Code of Practice for Standard Sand for Testing Cement – Specifications (Second Revision), Bureau of Indian Standards, New Delhi
5. IS: 2386 (Part-III) -1963, Indian Standard Methods of Test for Aggregates for Concrete, Bureau of Indian Standards, New Delhi
6. IS: 1199-1959, Indian Standard Methods of Sampling and Analysis of Concrete, Bureau of Indian Standards, New Delhi
7. IS: 516-1959, Indian Standard Methods of Tests for Strength of Concrete, Bureau of Indian Standards, New Delhi
8. IS: 13311 (Part-1)-1992, Indian Standard Non-Destructive Testing of Concrete – Methods of Test, Part-1 Ultrasonic Pulse Velocity, Bureau of Indian Standards, New Delhi
9. IS: 13311 (Part-2)-1992, Indian Standard Non-Destructive Testing of Concrete – Methods of Test, Part-2 Rebound Hammer, Bureau of Indian Standards, New Delhi
10. IS: 4031(Part-2)-1999, Indian Standard Methods of Physical Tests for Hydraulic Cement, Determination of Fineness by Blaine Air Permeability Method, Bureau of Indian Standards, New Delhi

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E -I SEMESTER
SURVEYING CAMP

Instruction	: --------	Sem Exam Marks	: 0	Subject Reference Code	: CE 3041
Credits	: 2	Sessional Marks	: 50	Duration of Sem Exam	: ---------

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to introduce 1. Field exercises with modern surveying equipment including GPS and Total Station. 2. All aspects of executing and plotting of field surveys 3. Work in a team and make effective presentations 4. Capturing topographical features	*Upon the completion of this course students will be expected to* 1. Apply the principles and operate various advanced surveying instruments. 2. Compute the differences in elevation drawn and utilize contour plots, and volumes for earthwork. 3. Interpret the need for accurate and thorough note taking in field work to serve as a legal record. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

Course Content:

A one week (6 days, 36 hours) surveying camp should be organized in the intervening period between the completion of the II year, II semester and the commencement of III year, I semester.

The work has to be graded for 50 Sessional marks by a committee consisting of the Head of the Department and 2 - 3 senior faculty members.

The surveying camp should expose the students to all the aspects of planning, organizing and conducting a field survey, and plotting of the same.

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
REINFORCED CONCRETE DESIGN - II

Instruction	: 4+1 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3510
Credits	: 4	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce 1. Design codes of practice for Reinforced Concrete 2. Design of concrete structures viz., combined footing, retaining walls, water tanks and bridges as per standard codes of practice	*Upon the completion of this course students will be expected to* 1. Design rectangular combined footing and understand the principles of design of trapezoidal footing 2. Analyse and design cantilever and counterfort retaining walls for different load conditions 3. Analyse and design water tanks resting on ground and overhead water tanks 4. Understand IRC loadings and various methods of analysis of bridges 5. Design slab bridge and T-beam bridge

UNIT-I :

Combined Footing and Retaining walls: Limit state design & detailing of combined rectangular footing and principles of design of trapezoidal footing. Limit state design & detailing of cantilever and counter fort retaining walls subjected to different earth pressure conditions.

UNIT-II :

Water Tanks: Elastic Design & Detailing for RCC circular and rectangular ground level and over-head water tanks-Design of staging. Principles of Design of Intze tanks.

UNIT-III :

Bridges:IRC loadings; Elastic design and detailing of two lane, simply supported RC Slab Bridge using effective width method. Elastic design and detailing of two lane, simply supported RC T-beam bridge using effective width method, Pigeaud's method and Courbon's method.

Learning Resources :

1. Krishna Raju N., "Structural Design and Drawing – Reinforced Concrete and Steel", Orient Blackswan Pvt Ltd, 2009
2. Krishna Raju N., "Design of Bridges", Oxford & IBH Publication Company, 2008.
3. Jagadeesh T.R. and Jayaram M.A, "Design of Bridge Structures", PHI Learning Private Limited, 2014
4. Bhavikatti S.S., "Advanced R.C.C. Design", Volume-II, New Age International, 2016.
5. Shah H.J., "Reinforced Concrete", Volume-II, Charotar Publishing House, 2012.
6. Punmia B.C., Ashok k Jain, Arun K Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications, 2012.
7. Krishna Raju N., "Advanced Reinforced Concrete Design", CBS Publishers, 2016.
8. IS:456-2000, Code of Practice for Plain and Reinforced concrete, Bureau of Indian Standards, New Delhi, India.
9. IS:3370-2009, Part I and Part IICode of Practice for Concrete Structures for Storage of Liquids, Bureau of Indian Standards, New Delhi, India.
10. IRC 5- 2000, Standard specification and code of practice for road bridges, Section I, General Features of Design, IRC, New Delhi, India.
11. IRC 6- 2000, Standard specification and code of practice for road bridges, Section II, Loads and Stresses, IRC, New Delhi, India.
12. IRC 21- 2000, Standard specification and code of practice for road bridges, Section III, Cement Concrete (Plain and Reinforced), IRC, New Delhi, India.
13. SP 34: Handbook on Concrete Reinforcement and Detailing (With Amendment 1), Bureau of Indian Standards, New Delhi, India
14. IS: 875-1987 Code of Practice For Design Loads (Other Than Earthquake)For Buildings And Structures Parts (1,2,3,4&5), Bureau of Indian Standards, New Delhi, India

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
DESIGN OF STEEL STRUCTURES-I

Instruction	: 4+1 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3520
Credits	: 4	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Understand the design philosophies of steel structures. 2. Design the bolted connections, welded connections including detailing, tension members, compression members and beams by limit state design as per IS: 800-2007. 3. Estimate the loads on roof trusses and design the members of roof truss.	*Upon the completion of this course students will be expected to* 1. Design bolted connections and welded connections by limit state method. 2. Design tension members using limit state method. 3. Design laterally supported and unsupported beams by limit state method. 4. Design compression members including connections like lacing and battening, splices and column bases by limit state method. 5. Design the members of roof trusses by limit state design.

UNIT-I :

Materials and Specifications (Limit State Design): Chemical composition of steel, types of Structural Steel - classification of Rolled Steel Sections.

Design Philosophies: Elastic orworking stress design, plastic or limit design and limit state design

Limit State Design: Loads & load combinations, characteristic loads, design loads, design strength, partial safety factors for materials and loads.

Bolted Connections: Types of bolts, types of bolted joints, load transfer mechanism, modes of failure of bolted joints, design of bolted joints using ordinary black bolts for concentric loads. High strength friction grip bolts.

Welded Connections: Types of welds, types of welded joints, design of welded joints for concentric loads using fillet welds and butt welds.

UNIT-II :

Design of Tension Members (Limit State Design): Introduction to tension members - applications of tension members, modes of failure, design of tension members – design of lug angles, tension splices - staggered bolting.

UNIT-III :

Design of Compression Members (Limit State Design): Introduction, sections used for compression members. Effective length of compression members, slenderness ratio, types of buckling, design of compression members for axial loads with single section and built-up sections (symmetric in both directions), lacing and battening, column splices.

Design of Column Bases: Design of slab base and gusseted base for axial loads.

UNIT-IV :

Design of Beams (Limit State Design): Introduction to plastic analysis - plastic hinge, plastic moment, shape factor. Classification of cross sections, phenomenon of lateral torsional buckling; design of laterally restrained beams and laterally unrestrained beams, secondary considerations - check for web crippling, web buckling & deflection. Introduction to beam columns (no design problems).

UNIT-V :

Design of Roof trusses (Limit State Design): Types of trusses, estimation of loads - dead load, live load and wind load, design of purlins, analysis of roof trusses and design of its members with angle sections. Bracings of roof trusses. Introduction to Pre-engineered buildings.

Learning Resources :

1. Duggal S.K., "Design of Steel Structures", 2nd Edition, Tata McGraw Hill Publishing, 2014
2. Gambhir M.L., "Fundamentals of Structural Steel Design", McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2013
3. Bhavikatti S.S., "Design of steel Structures", 4th Edition, I.K. International Publishing House Pvt. Ltd. 2014.
4. Subramanian N, "Design of Steel Structures", Oxford University Press, 2008.
5. IS: 800-2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi
6. IS: 875-1987: Code of Practice for Design loads for buildings and structures, Bureau of Indian Standards, New Delhi
7. ISI Handbook No. 1 or Steel Tables by Bhavikatti S.S.
8. http://nptel.ac.in/courses/105103094/
9. www.steel-insdag.org

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
THEORY OF STRUCTURES-II

Instruction	: 4+1 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3530
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Explain the use of influence line diagrams in the analysis of simply supported beams and trusses subjected to moving loads. 2. Perform analysis of cable and suspension bridges. 3. Analyze beams and frames using flexibility method and stiffness method, and to develop element stiffness matrices and assembly of global stiffness matrices.	1. Draw influence line diagrams for the analysis of a simply supported beam subjected to moving loads. 2. Draw influence line diagrams for forces in the members of trusses and calculate the forces in the suspension bridge. 3. Apply flexibility method for analysis of beams and frames. 4. Perform analysis of beams and frames using stiffness method. 5. Development element stiffness matrices and assembly of global stiffness matrices and load matrices.

UNIT-I :
Moving loads and influence line diagrams: Influence lines for reaction, bending moment and shear force. Determination of maximum bending moment and shear force for moving load systems on simply supported girders, Curves of maximum bending moment and shear force for simply supported girders traversed, by (i) single point load, (ii) two point loads, (iii) uniformly distributed load longer than span, and (iv) uniformly distributed load shorter than span, enveloping parabola and EUDLL.

UNIT-II :
Moving loads on trusses and arches: Influence lines for forces in members of statically determinate trusses under moving loads (warren truss and Pratt truss). Influence line diagrams for three hinged parabolic arches.
Suspension Bridges: Stresses in suspension cables, length of cable, analysis of suspension bridge with 3-hinged stiffening girders for static loading.

UNIT-III :
Flexibility Method of Analysis: Analysis of continuous beams, pin jointed plane trusses, rigid jointed plane frames with static indeterminacy not exceeding three.

UNIT-IV :
Stiffness Method of Analysis: Analysis of continuous beams, pin jointed plane trusses, rigid jointed plane frames with kinematic indeterminacy not exceeding three. Effect of temperature, lack of fit and pre-stressing forces.

UNIT-V :
Direct Stiffness Method: Development of element stiffness matrices for bar, truss, beam and plane frame elements. Transformation matrices, assembly of global stiffness matrices and load matrices. Finding displacements and member end action matrices.

Learning Resources :

1. Vazirani V.N., Ratwani M.M, Duggal S.K., "Analysis of Structures - Vol. II Theory, Design and Details of Structures", Khanna Publishers, 16th Edition, 2015.
2. Thandavamoorthy T.S., "Structural Analysis", Oxford Higher Education, Second Edition, 2012.
3. Weaver and Gere, "Matrix Analysis of Framed Structures", CBS Publisher, 2004
4. Ramamrutham S., Narayan R., "Theory of Structures", Dhanpath Rai publications, 2014
5. Devdas Menon, "Structural Analysis", 1st Edition, Narosa Book Distributors Pvt Ltd,2014.
6. Reddy C.S., "Basic Structural Analysis", 3rd Edition, Mc Graw Hill, 2010.
7. Junarkar S.B., Shah, "Mechanics of Structures", Volume II, Charotar Pub. House, 2010.
8. Chu-Kia Wang, "Intermediate Structural Analysis (English) 1st Edition", McGraw Hill Education, 2010.
9. Hibbeler R.C., "Structural Analysis", 8/E, Prentice Hall, Higher Education, 2012.
10. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2nd Edition, Wiley India Pvt. Ltd., 2011.

Online Resources:
http://nptel.ac.in/courses/105101086/

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
GEOTECHNICAL ENGINEERING

Instruction	: 4 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3540
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Determine stress distribution in soils. 2. Calculate bearing capacity of soils for shallow and pile foundations and design various types of engineering structures. 3. Examine soil exploration and select an appropriate drilling, sampling and field property measurement tools for different soil profiles.	*Upon the completion of this course students will be expected to* 1. Evaluate the stress distribution in soils under various loading conditions. 2. Calculate bearing capacity and analyse settlement of soils. 3. Estimate the capacity of piles and pile groups. 4. Understand different construction methods for coffer dams and caissons. 5. Interpret various excavation methods, dewatering and site investigation techniques

UNIT-I :

Stress Distribution in Soils: Boussinesq's and Westergaard's equations for point load. Application of point load formulae for uniformly distributed load on circular and rectangular areas. Use of Newmark's chart (for Boussinesq's equation). Contact pressure distribution.

UNIT-II :

Bearing Capacity of soils: Terzaghi's equation for bearing capacity in soils – it's modification for continuous, square, rectangular and circular footings, general and local shear failure conditions. Allowable bearing capacity. Standard penetration test and use of 'N' values for estimating soil conditions and bearing capacity. Proportioning of footings.

Settlement Analysis: Computation of pressures before loading and after loading. Estimation of settlement – ultimate and after any given period. Correction for construction period.

UNIT-III :

Pile Foundations: Types of piles – timber, steel, concrete, cast-in-situ, precast piles, bearing piles, friction piles, compaction piles, large diameter piles. Pile capacity – static formulae, dynamic formulae, pile load test, determination of point resistance and skin friction as per IS code. Bearing capacity of pile groups, negative skin friction.

UNIT-IV :

Coffer Dams: Earth embankments, Cantilever sheet files, braced coffer dams, double wall coffer dams, cellular dams – circular, diaphragm type, general description and construction methods.

Cassions: Types of cassions – open, pneumatic and box cassions (floating cassions). General description and construction methods – Types and uses. Different shapes of wells, Design of individual components of the well, sinking of wells, Measures for rectification of tilts and shifts.

UNIT-V :

Dewatering Techniques: Sumps, ditches, well points, deep wells.

Timbering of Excavation: Bracings for shallow and deep excavation. Computation of lateral earth pressure. Reactions of struts.

Site investigation: Principles of exploration, sampling methods, transportation and storage of samples, boring and drilling methods, log of bore holes, sampling tubes and samplers. Sampling records. Introduction to Ground improvement techniques.

Learning Resources:

1. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2015.
2. Gopal Ranjan, Rao A.S., "Basic and Applied Soil Mechanics", Wiley Eastern Limited, third edition, 2016.
3. Arora K.R., "Soil Mechanics and Foundation Engineering", Standards Publisher 2009.
4. Venkatramaiah C., "Geo-technical Engineering", New Age Publishers, fourth edition, 2012.
5. Shenbaga Kaniraj, "Design Aids In Soil Mechanics and Foundation Engineering", McGraw Hill Education (India) Private Limited, 2001.

Online Resources

4. http://nptel.ac.in/courses/105107120/
5. http://nptel.ac.in/courses/105101084/

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
WATER RESOURCES ENGINEERING-I

Instruction	: 4 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3550
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. To explain the different methods of irrigation and related terms. 2. To compute rainfall, runoff and estimate floods in a catchment area. 3. To describe the various aspects of reservoirs, types and functions of spill ways and energy dissipators.	*Upon the completion of this course students will be expected to* 1. Explain types and methods of irrigation and related terms. 2. Estimate rainfall, runoff and floods using different methods. 3. Estimate the capacity of reservoir and flood routing. 4. Analyse gravity dams 5. Describe the types and functions of spill ways and energy dissipators.

UNIT-I :

Irrigation: Necessity of irrigation, duty, delta and base period of crops, methods of irrigation, irrigation efficiencies, depth of irrigation, wilting point, consumptive use, practical irrigation water problems.

UNIT-II :

Precipitation: Hydrologic cycle, rainfall, measurement of rainfall and estimation of mean rainfall over a catchment, infiltration, evaporation, runoff, factors affecting runoff, peak flow estimation, Unit Hydrograph, S-Hydrograph and variations.

UNIT-III :

Reservoir Planning: Selection of site, zones of storage in a reservoir, storage capacity analysis, reservoir sedimentation, flood routing through retarding basin. Estimation of life of a reservoir.

UNIT-IV :

Storage Head Works: Types of dams, advantages & disadvantages, selection criteria, economical height of the dam, gravity dam, forces acting on dam, stability analysis, elementary profile and practical profile, low and high gravity dams.

UNIT-V :

Spill Ways & Energy Dissipation: Types of spill ways, ogee spill ways, design of ogee profile, description of syphon spill way & chute spill way. Energy dissipators, hydraulic jump & bucket type dissipators, tail water rating curve & jump height curve.

Learning Resources :

1. Modi P.N., "Irrigation & Water Resources and Water Power", Standard Book House, New Delhi, 2008.
2. Patra K.C., "Hydrology and Water Resources Engineering", Narosa Publishers, 2008.
3. Garg S.K., "Irrigation Engineering & Hydraulic Structures", Khanna Publishers, 2009.

Online Resources

4. http://nptel.ac.in/courses/105104103/

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
TRANSPORTATION ENGINEERING-I

Instruction	: 4 Periods/week	Sem. Exam Marks	: 70	Subject Ref. Code: CE 3560
Credits	: 3	Sessional Marks	: 30	Duration of Sem. Exam: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to	*Upon the completion of this course students will be expected to*
1. Understand the need of highways and its classification as per IRC codes	1. Express the fundamentals of highway planning and perform geometric design of a transportation facility
2. Design the highway geometrics as per standard code of practice	2. Compute key elements on various traffic studies, present and analyse traffic data
3. Study various traffic studies including analysis and design	3. Interpret basic concepts of material characterization as per standard specifications including mix designs.
4. Understand various material characteristics and its applications in field.	4. Design flexible and rigid pavements as per IRC guidelines
5. Design pavements and its maintenance as per prevailing IRC codes	5. Employ various construction techniques adopted in field, identify the causes of various pavement failures and suggest appropriate treatment.

UNIT-I : HIGHWAY CLASSIFICATION, ALIGNMENT AND GEOMETRIC DESIGN

Introduction, Highway development in India, Functional classification of roads as per IRC, Road patterns,

Highway alignment – Requirements and factors controlling alignment of roads – Factors governing geometric design ,

Highway cross-sectional elements – Carriageway, Shoulders, Medians, Right of way, Footpaths, Bus bays, Cycle tracks, Service roads, Frontage roads, Camber. Sight distances – Stopping and overtaking sight distance.

Design of horizontal alignment – Speed, radius, super elevation, extra widening, transition curves.

Design of vertical alignment – gradient, grade compensation, summit curves and valley curves

UNIT-II : TRAFFIC ENGINEERING

Basic traffic characteristics – Volume, speed, density, headways and relationship among them.

Traffic studies - Objectives of traffic studies, Methods of data collection and presentation of various traffic studies such as volume studies, speed studies, speed and delay studies, origin destination studies, intersection delay studies, parking studies, accident studies. Highway capacity and Level of service concept as per HCM.

Traffic regulation and control – Traffic signs, signals, markings and channelization. Principles of design of at-grade intersections – Simple layouts. Design of isolated signal by Webster method and IRC method. Introduction to grade separated intersections.

UNIT-III :PAVEMENT MATERIAL CHARACTERISATION

Types of pavements and factors to be considered for pavement design.

Aggregates –physical properties of aggregates such as gradation and size, toughness and abrasion resistance, durability and soundness, particle shape and surface texture, specific gravity, cleanliness and deleterious materials; chemical properties - stripping of aggregates and alkali aggregate reaction

Binders – Types of paving binders – bitumen, tar, cutback, emulsion, modified binders, evaluation of rheological behaviour of bitumen by flash and fire point test, penetration test, softening point test, ductility test, Fraass breaking point test, viscosity test , Specific gravity test , measurement of aging using thin film oven test, elastic recovery test, separation test

Gradation of bituminous binders- penetration grading, Viscosity grading and performance grading. Blending of aggregates by Rothfuch's method and 0.45 power gradation, Bituminous mix design by Marshall stability test.

UNIT-IV :PAVEMENT DESIGN

Flexible pavement design – concept of layer theory, design wheel load, ESWL, EAL, vehicle damage factor, IRC design as per IRC 37:2012. **Rigid pavement design –** Concepts, Design of rigid pavements as per IRC 58: 2015, Stress analysis by Westergaard. Joints in CC pavements and their functions.

UNIT-V :PAVEMENT CONSTRUCTION AND MAINTENANCE

Pavement construction - Construction of Water bound Macadam, Wet Mix Macadam and Granular sub base roads. Construction of Dense Bituminous macadam, Bituminous Macadam, Semi-Dense Bituminous Concrete, Bituminous Concrete, Built-up spray grout, Open Graded Premix Carpet, Mix Seal Surfacing, prime coat, tack coat, seal coat as per MORTH specifications.

Pavement evaluation and maintenance - Pavement failures – types, causes and remedies, Maintenance of bituminous and cement concrete pavements.

Learning Resources:

1. Khanna S.K., Justo C.E.G., Veeraraghavan A., "Highway Engineering", 10th Edition, Nem Chand & Bros, 2015
2. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publishers, 2016.
3. Nicholas J. Garber Lester A. Hoel, Traffic and Highway Engineering- III edition, Cengage publication Indian edition 2006.
4. Yoder E.J., Witczak M.W., Principles of Pavement Design, John Wiley & Sons –Indian edition. 2008
5. Srinivasa Kumar R., Pavement design, Orient Blackswan Pvt. Ltd., New Delhi, 2013
6. IRC:37 : 2012 : Tentative guidelines for the design of flexible pavements
7. IRC 58 :2015: Guidelines for the design of plain jointed rigid pavements
8. IRC MORT&H- Specifications for road and bridge works, 2013 (Fifth Revision)
9. IRC 11-2015 (Cycle tracks), IRC 15 -2011 (construction of cement concrete roads), IRC 35 -2015 (Road markings), IRC 38 -1988 (Horizontal curves), IRC 53 -2012 (Accident forms), IRC 65-1976 (Traffic rotaries), IRC 67 -2012 (Road signs), IRC:82-2015 (Maintenance of BT roads), IRC:86-1983 (geometric design standards), IRC:93-1985 (traffic signals), IRC:103-2012 (pedestrian facilities), IRC:106-1990 (capacity), IRC:SP:23-1983 (vertical curves), IRC:SP:41-1994 (at-grade intersection)
10. www.pavementinteractive.org
11. http://nptel.ac.in/courses/105105107/

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
FINISHING SCHOOL – IV : SOFT SKILLS

Instruction	: 2 Periods/week	Sem. Exam Marks	: 35	Subject Ref. Code:HS3210
Credits	: 01	Sessional Marks	: 15	Duration of Sem. Exam:1.5 Hrs

Course Objective:	Course Outcomes
This course aims at enhancing the employability skills. Students will be trained in higher order thinking skills including analytical skills, problem solving skills and critical & logical reasoning skills. Students will be trained to work systematically and develop logical and analytical thinking. Students will be trained in the following areas 1. Critical and Non verbal reasoning 2. Pure Maths 3. Verbal ability 4. Logical reasoning 5. Data Interpretation and Analysis	**At the end of the course students will be able to:** • Understand the fundamentals concepts of Aptitude and verbal skills • Solve questions using short cuts and smart methods • Perform calculations with speed and accuracy • Develop Analytical thinking and problem solving skills

UNIT 1 VERBAL ABILITY Finding errors

- Vocabulary
- Synonyms
- Antonyms
- Idioms and Phrases
- Fill in the blanks and sentence Jumbles
- Reading comprehension

UNIT 2 LOGICAL REASONING

- Logical Reasoning
- Assignments
- Puzzles
- Blood relations
- Syllogisms

UNIT 3 CRITICAL AND NON VERBAL REASONING

- Critical Reasoning
- Non verbal reasoning
- Figure series and completions

UNIT 4 QUANTITATIVE APTITUDE - PURE MATHS

- Pure maths
- Algebra
- Probability
- Permutations and combinations

UNIT 5 DATA INTERPRETATION AND ANALYSIS

- Data Interpretation
- Line graph
- Pie chart
- Tabulation

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
FINISHING SCHOOL – IV : TECHNICAL SKILLS

Instruction	: 2 Periods/week	Sem. Exam Marks	: 35	Subject Ref. Code:HS3210
Credits	: 01	Sessional Marks	: 15	Duration of Sem. Exam:1.5 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Explain 2D and 3D plotting 2. Describe interpolation and curve fitting 3. Solve ordinary differential equations 4. Explain the method of solving partial differential equations 5. Describe numerical integration	*Upon the completion of this course students will be expected to* 1. Create 2D and 3D plots 2. Perform interpolation and curve fitting 3. Solve differential equations 4. Solve Laplace equations 5. Understand numerical integration

UNIT-I :
Plotting:Two-dimensional plots, subplots, three-dimensional plotting, creating plots from workspace window.

UNIT-II :
Interpolation, curve fitting

UNIT-III :
Solving ordinary differential equations

UNIT-IV :
Partial Differential Equations, Laplace equation

UNIT-V :
Numerical Integration

Learning Resources :

1. Holly Moore, "MATLAB for Engineers", 3rd ed, Pearson Publication, 2012
2. Agam Kumar Tyag, "MATLAB and Simulink for Engineers", Oxford Higher Education
3. Rao V Dukkipati, "MATLAB An Introduction with applications"

With effect from the A.Y 2016-17

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
ENVIRONMENTAL ENGINEERING LAB

Instruction	: 3 Periods/week	Sem. Exam Marks	: 50	Subject Ref. Code: CE 3511
Credits	: 02	Sessional Marks	: 25	Duration of Sem. Exam:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Familiarize with the procedures of water quality analysis. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) for sewage samples. 3. Calculate the coagulant dosage for reduction of turbidity and disinfection dosage. 4. Practice working of flame photometer.	*Upon the completion of this course students will be expected to* 1. Analyse the water samples for the determination of alkalinity, hardness, chlorides, calcium, pH, contents of sodium and potassium in water using flame photometer, total dissolved solids and turbidity. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in sewage samples. 3. Calculate the coagulant dosage for reducing the turbidity and disinfection dosage. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

1. Determination of Alkalinity.
2. Determination of Hardness.
3. Determination of Chlorides.
4. Determination of Acidity.
5. Determination of Variation of pH.
6. Determination of Dissolved Oxygen
7. Determination of Biochemical Oxygen Demand (B.O.D.)
8. Determination of total dissolved solids
9. Determination of residual chlorine.
10. Determination of turbidity
11. Determination of coagulant dose – Jar test.
12. Determination of Chemical Oxygen Demand (C.O.D.)
13. Determination of Sodium & Potassium present in water using flame photometer (Demonstration).

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
COMPUTER APPLICATIONS-I LAB

Instruction	: 3 Periods/week	Sem. Exam Marks	: 50	Subject Ref. Code: CE 3521
Credits	: 02	Sessional Marks	: 25	Duration of Sem. Exam:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Solve Civil Engineering problems using 'C' programming language 2. Use a structural analysis and design software for the design of a few simple structures	*Upon the completion of this course students will be expected to* 1. Write 'C' programs for the solution of simple Civil engineering problems. 2. Use a structural analysis and design software to design beams. 3. Perform analysis and design of rigid jointed plane frames and space frames using the software. 4. Design a G+2 residential building. 5. Analyse and design a steel structure.

LIST OF EXPERIMENTS

Solution of Civil Engineering Problems using 'C' programming language:

Write programs to:

1. Design a circular sewer.
2. Find optimum diameter for flow through pipe.
3. To find super elevation of a road for a horizontal curve.
4. Find deflection in a simply supported beam using finite difference method.

Introduction of a structural analysis and design software for the design of RCC and Steel structures:

RCC Design:

Perform analysis and design of:

5. Beams
6. Plane frames
7. Space frames
8. G+2 residential building

Steel Design:
Perform analysis and design of:

9. Trusses
10. Frames

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR III/IV B.E SECOND SEMESTER
TRANSPORTATION ENGINEERING LAB

Instruction	: 3 Periods/week	Sem. Exam Marks	: 50	Subject Ref. Code: CE 3531
Credits	: 02	Sessional Marks	: 25	Duration of Sem. Exam:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of the course are to 1. Impart basic knowledge to carry out quality control lab tests for roads in highway engineering practice. 2. Conduct quality control in road construction as per standards and introduce the concepts of design mix 3. Conduct traffic studies and present the data for transportation engineering applications	*Upon the completion of this course students will be expected to* 1. Perform experiments on aggregates and bitumen on their suitability for road construction 2. Understand basic traffic studies for transportation planning, design and evaluation. 3. Interpret tests on job mix formula and Marshall stability tests 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

A) Tests on road aggregates

1. Aggregate crushing value test
2. Los Angeles abrasion test
3. Aggregate impact value test
4. Aggregate shape test (flakiness & elongation)
5. Water absorption & Specific gravity of Aggregate
6. Job mix formula by Rothfuch Method

B) Tests on bitumen

7. Penetration Test
8. Ductility Test
9. Elastic Recovery Test
10. Softening point Test
11. Specific gravity Test
12. Viscosity Test
13. Flash and fire point Test

C) Traffic Studies

14. Classified Traffic volume study at mid blocks
15. Spot Speed Study
16. O & D Study concepts
17. Headway studies

D) Miscellaneous Tests (demonstration only)

18. Bitumen extraction test
19. Marshal stability Concepts and Tests