III – Year I Semester

S.No	CourseCode	Course Title	Category	L	T	P	C
1	19CE3111	Concrete Technology	PC	3	-	-	3
2	19CE3112	Transportation Engineering	PC	3	-	-	3
3	19CE3113	Soil Mechanics	PC	3	-	-	3
4	**Open Elective-I**		OE	3	-	-	3
5	**Professional Elective-I**		PE	3	-	-	3
	19CE3171	Alternative Building Materials and Technologies					
	19CE3172	Advanced Structural Analysis					
	19CE3173	Advanced Fluid Mechanics					
	19CE3174	Irrigation & Hydraulic Structure					
6	19CE3151	Soil Mechanics Lab	PC	-	-	3	1.5
7	19CE3152	Concrete Technology Lab	PC	-	-	3	1.5
8	19CE3153	Building Information Modelling	PC			2	1.5
9	19CE3181	Summer Internship	PW	-	-	-	1
10	19MC0005	Human Values and Professional Ethics	MC	3	-	-	-
Total			**26**	**18**	**00**	**08**	**20.5**

III – Year II Semester

S.No	CourseCode	Course Title	Category	L	T	P	C
1	19MB3211	Business Economics & Financial Analysis	HS	3	-	-	3
2	19CE3212	Design of Reinforced Concrete Structures	PC	3	-	-	3
3	19CE3213	Environmental Engineering	PC	3	-	-	3
4		**Open Elective-II**	OE	3	-	-	3
5		**Professional Elective-II**	PE	3	-	-	3
	19CE3271	Engineering Materials for Sustainability					
	19CE3272	Advanced structural design					
	19CE3273	Foundation Engineering					
	19CE3274	Air Pollution and Control					
6	19CE3251	Advanced Surveying Lab	PC	-	-	3	1.5
7	19CE3252	Environmental Engineering Lab	PC	-	-	3	1.5
8	19HS3253	Advanced English Communication Skills Lab	HS	-	-	3	1.5
9	19CE3291	Technical paper Presentation	PW	-	-	2	1
Total			**26**	**15**	**00**	**11**	**20.5**

Open Electives offered by the Department of Civil Engineering to other departments

S.No.	Open Elective	Subjects
1.	Open Elective - I	Disaster Management
		Building Materials and Technologies
2.	Open Elective – II	Remote Sensing & GIS
		Environmental Pollution
3.	Open Elective - III	Road safety Engineering
		Environmental Impact Assessment

19CE3111: CONCRETE TECHNOLOGY

B.Tech. III Year I Sem

L	T	P	C
3	**0**	**0**	**3**

Course Objectives: The objectives of the course are to

1. Know different types of cement as per their properties for differentfield applications.
2. UnderstandDesigneconomicconcretemixproportionfordifferent exposure conditions and intendedpurposes.
3. Know field and laboratory tests on concrete in plastic and hardenedstage.

Course Outcomes: After the completion of the course student should be able to

1. Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-termbehavior.
2. Apply the use of various chemical admixtures and mineral additives todesign cement-based materials with tailor-madeproperties
3. Use advanced laboratory techniques to characterize cement-basedmaterials.
4. Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.

UNIT I

Cement: Portland cement – chemical composition – Hydration, Setting of cement Structure of hydrated cement – Tests on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classificationofaggregate–Particleshape&texture–Bond,strength&other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption&moisturecontentofaggregate–Bulkingofsand–Deleterioussubstance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine, Manufactured sand and coarse Aggregates – Gap graded aggregate – Maximum aggregate size- Properties Recycledaggregate.

UNIT – III

FreshConcrete: Workability – Factorsaffecting workability– Measurement ofworkability by different tests – Setting time of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing, vibration ofconcrete–Stepsinmanufactureofconcrete–Qualityofmixingwater.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gel/space ratio – Gain of strength of concrete – Maturity concept – Strength in tension and compression – Factors affecting strength – Relation between compression and tensile strength - Curing.

Testing of Hardened Concrete: compressive strength test and Tensile strength of concrete – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

Elasticity, Creep & Shrinkage – Modulus of elasticity – Dynamic modulus of elasticity– Posisson'sratio–Creepofconcrete–Factorsinfluencingcreep–Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT –V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special Concretes: Introduction to Light weight concrete – Cellular concrete – No-finesconcrete–Highdensityconcrete–Fiberreinforcedconcrete–PolymerconcreteHigh performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Concrete Technology by M.S. Shetty. – S. Chand & Co.;2004
2. ConcreteTechnologybyA.R.Santhakumar,2nd Edition,OxforduniversityPress, NewDelhi
3. ConcreteTechnologybyM.L.Gambhir.–TataMc.GrawHillPublishers,New Delhi

REFERENCES:

1. Properties of Concrete by A. M. Neville – Low priced Edition –4thedition
2. Concrete:Microstructure,PropertiesandMaterials–P.K.Mehtaand
3. J.M. Monteiro, Mc- Graw Hill Publishers

IS CODES:

IS 10262 :2019 “Concrete Mix Proportioning –Guidelines”

IS 516:2006 “Methods of Tests on Strength ofConcrete”

IS383:1993“SpecificationForCoarseAndFineAggregatesFrom Natural Sources ForConcrete”.

19CE3112-TRANSPORTATIONENGINEERING

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

CourseObjectives: Tolearn

1. Acomprehensiveinsightofvariousgeometricaldesign,horizontalandverticalalignmentofHighways .
2. The tests to be conducted on soil, aggregates, bitumen and modified binders forcharacterization of different materials needed for highway construction along withbitumenconcrete mixdesign and advancedconcretes for roadapplication.
3. The various types of pavements, analysis and design of flexible & rigid pavement asper IRC codespecifications and also overlay designs.
4. The various traffic engineering studies, design of traffic signal & road intersection and possible solutions to the traffic related issues.

Courseoutcomes:

Afterlearning thecontents of this course,thestudent must beable to

1. Describe the various elements of a highway.
2. Develop Geometric Design for highways.
3. Judge the suitability of the highway materials
4. Design flexible and rigid pavements.
5. Describe traffic characteristics and signal systems.

UNIT-I:Highway Alignment

Classification of Urban and Rural roads, Requirements of Ideal Alignment, FactorsControlling Highway Alignment, Engineering Surveys for Alignment - Conventional Methods, Highway Cross Sectional Elements - Right of Way, Carriage Way, Camber, Kerbs, Shoulders and Footpaths [IRC Standards], Cross sections of different Class of Roads.

UNIT-II:HighwayGeometricDesign

Design of Horizontal Alignments –Sight Distances – Factors affecting Sight Distances, PIEV theory, Stopping Sight Distance (SSD), Overtaking Sight Distance (OSD), Sight Distance at Intersections, Intermediate Sight Distance and Illumination of Sight Distance [Derivations and Problems in SSD and OSD], Super elevation, Design Speed, Radius of horizontal curve, Widening of Pavements on Horizontal Curves and Transition Curves [Derivation of Formulae and Problems] Design of Vertical Alignments – Rolling, Limiting, Exceptional and Minimum Gradients, Summit and Valley Curves, Geometric Design of Hill Roads [IRC Standards Only

UNIT-III:HighwayMaterials andConstruction Practice

Desirable Properties and Testing of Highway Materials: - (Tests have to be demonstrated in Highway Engineering Laboratory) Soil - California Bearing Ratio Test, Field Density Test, Aggregate - Crushing, Abrasion, Impact Tests, Water absorption, Flakiness and Elongation indices. Bitumen - Penetration, Ductility, Viscosity, Binder content and Softening point Tests. Construction Practice – Subgrade, Granular Sub Base, Wet Mix Macadam, Bituminous Road and Cement Concrete Road [as per IRC and MORTH specifications] Highway Drainage [IRC Recommendations]

UNIT- IV:PavementDesign

IntroductiontoPavementDesign:Typesof pavementsandtheir typicalcrosssections:flexible, rigid and composite; Flexible Pavement analysis and design: Introduction to multilayered analysis, IRC 37-2012 method of flexible pavement design; Rigid pavement analysisand design: Factors controlling rigid

pavement design, types of stresses in rigid pavements,critical load positions, load stresses and temperature stresses in interior, corner and edgelocations of jointed plain cement concrete pavement slabs, IRC 58-2002 method of rigidpavementdesign;Overlay :Types ofoverlayson flexibleand rigidpavements.

UNIT-V:Traffic Engineering

Traffic Characteristics, Traffic Studies – Volume study, Speed studies-spot speed, speed and delay, OD studies, Traffic flow characteristics on flow, Capacity studies-PCU, Fundamental relationships Control devices- Traffic Signs and signals (Webster's method), Intersection, At Grade, Channelized, Rotary Intersection.

TEXTBOOKS:

1. Khanna,S.K,Justo,AandVeeraragavan,A,'HighwayEngineering',NemChand&Bros.Revised Tenth Edition, 2015
2. Kadiyali L.R. and Lal N B, Principles and Practices of Highway Engineering; SeventhEdition,First Reprint; KhannaPublishers, NewDelhi,2018

REFERENCES:

1. Papacoastas, C. S. and Prevedouros, Transportation Engineering and Planning, ThirdEdition,ThirdImpression; PearsonEducation, 2018.
2. Khisty C J and Lall B Kent; Transportation Engineering: An Introduction, ThirdEdition, 1st Indian Adaptation; Pearson India Education Service Pvt. Ltd, New Delhi2017.
3. C Venkatramaih, Transportation Engineering Volume 1 – Highway Engineering, 1stEdition,Universities Press, 2016
4. Nicholas J Garber and Lester A Hoel, Traffic and Highway Engineering, 5th Edition,CengageLearning IndiaPrivateLimited, NewDelhi, 5thIndian Reprint,2015.
5. SubhashCSaxena,TextBookofHighwayandTrafficEngineering;FirstEdition;CBSPublishersand Distributors. New Delhi, 2014

CodeofProvisions: DesignCodes:

1. IRC37-2012 Guidelines for the design of flexible pavements
2. IRC 58 - 2002Guidelines for the design of plain jointed pavements for highways
3. IRC81-1997 Guidelines for Strengthening of flexible road pavements usingBenkelman beam deflection technique

19CE3113 SOIL MECHANICS

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Course Objectives: The objectives of the course are to

- Understand the formation of soil and classification of the soils.
- Determine the Index & Engineering Properties of soils.
- Determine the flow characteristics & stresses due to externally applied loads.
- Estimate the consolidation properties of soils.
- Estimate the shear strength and seepage loss.

Course Outcomes: At the end of the course, the student will be able to

- Characterize and classify the soils.
- Estimate seepage, stresses under various loading conditions and compaction characteristics.
- Analyze the compressibility of the soils.
- Understand the strength of soils under various drainage conditions.

UNIT – I

Introduction: Soil formation and structure – moisture content – Mass, Three-phase system and phase relationships, volume relationships – Specific Gravity-Field density by core cutter and sand replacement methods-Relative density.

Index Properties of Soils: Grain size analysis – consistency limits and indices – Unified and I.S. Classification of soils.

UNIT –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils.

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – one dimensional flow, two - dimensional flow, Flownets: Characteristics and Uses, uplift pressure, piping.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas, contact pressure

Ccompaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties- laboratory methods –standard proctor test , modified proctor test - field methods proctor needle test – Types of Field compaction Equipment – compaction quality control for road works –embankments, subgrade .

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation -Spring analogy, stress history of clay; e-p and e-log(p) curves – normally consolidated soil, over consolidated soil and under consolidated soil – pre consolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement, case study for building , roads

UNIT - V

Shear Strength of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelops – Shear strength of sands, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths - dilatancy – critical void ratio.

TEXTBOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt Ltd.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.

REFERENCES:

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
2. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).
3. Soil Mechanics and Foundation by by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

19CE3171-ALTERNATIVE BUILDING MATERIALS AND TECHNOLOGIES

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Course Objectives: This Course will enable students to:

1. understand environmental issues due to building materials and the energy consumption in manufacturing building materials
2. study the various masonry blocks, masonry mortar and structural behavior of masonry under compression.
3. Study the alternative building materials in the present context.
4. understand the alternative building technologies which are followed in present construction field.

Course Outcomes: At the end of the course, the student will be able to

1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
2. Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.
3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.
4. Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.

UNIT-I

Introduction: Energy in building materials, Environmental issues concerned to building materials, Global warming and construction industry, and Environmental friendly and cost effective building technologies. Requirements for building of different climatic regions. Traditional building methods and vernacular architecture.

UNIT-II

Alternative building materials: Characteristics of building blocks for walls, Stones and Laterite blocks, Bricks and hollow clay blocks. Concrete blocks. Stabilized blocks: Mud Blocks, Steam Cured Blocks, Fal-G Blocks and Stone Masonry Block

UNIT-III

Lime pozzolana cements Raw materials, Manufacturing process, Properties and uses Fibre reinforced concretes. Matrix materials. Fibers :metal and synthetic Properties and Applications, Fibre reinforced plastics, Matrix materials Fibers: organic and synthetic . Properties and applications Building materials from agro and industrial wastes. Types of agro wastes. Types of industrial and mine wastes. Properties and applications. Field quality control test methods

UNIT-IV

Alternative building technologies: Alternative for wall construction. Types, Construction method. Masonry mortars, Types, Preparation, Properties. Ferro cement and ferro concrete building components Materials and specifications. Properties, Construction methods. Applications, Alternative roofing system, Concepts, Filler slabs, Composite beam panel roofs. Masonry vaults and domes.

UNIT-V

IS Code provisions, Design of masonry compression elements, Concepts in lateral load resistance. Cost effective building design: Cost concepts in buildings, Cost saving techniques in planning, design and construction, Cost Analysis: Case studies using alternatives.

TEXTBOOKS:

1. Properties of Concrete-A.M.Neville.Pitman Publishing Limited-London.
2. Alternative building methodologies for engineers and architects, K.S jagadish and B.V.Venkatarama Reddy,Indian Institute of Science,Bangalore.

REFERENCES BOOKS:

1. Light weight concrete-Academic kiado-Rudhai.G–Publishing home of Hungarian Academy of Sciences1 963.
2. Moderntrends in housing in developing countries–A.G.Madhava Rao D.S.Ramachandra Murthy& G.Annamalai

19CE3172: ADVANCED STRUCTURAL ANALYSIS

B.Tech. III Year I Sem

L	T	P	C
3	-	-	3

Course Objectives: To learn

1. Understand classical methods of analysis for statically indeterminatestructures.
2. Differentiate the approximate and numerical methods of analysis for indeterminate structures.
3. Differentiate the matrix methods of analysis.

Course outcomes:

After learning the contents of this paper the student must be able to

1. Solve statically indeterminate beams and portal frames using classicalmethods
2. Analyze the beams by matrixmethods
3. Develop the stiffness matrix of the frames and analyze them using displacementmethods.

UNIT-I:

Slope Deflection Method: Analysis of Single Bay Single Story Portal Frames with and without side Sway - Analysis of inclined frames - Shear force and bending moment diagrams, Elastic curve.

Moment Distribution Method: Analysis of Single Bay Single Storey Portal Frames with and without side Sway - Analysis of inclined frames - Shear force and bending moment diagrams.

UNIT-II

Kani's Method: Analysis of continuous beams including settlement of supports - Analysis of single bay single storey frames including Side Sway - Shear force and bending moment diagrams - Elastic curve.

UNIT-III

ApproximateMethodsofAnalysis: Introduction–Analysisofmulti-storeyframesforlateral loads: Portal Method, Cantilever method - Analysis of multi-storey frames for gravity loads- Substitute Framemethod

Influence Lines for Indeterminate Beams: Introduction – influence line diagram for shear forceandbendingmomentfortwospancontinuousbeamwithconstantanddifferentmoments of inertia - influence line diagram for shear force and bending moment for propped cantilever beams.

UNIT-IV

Introduction to Matrix Methods of Analysis: Introduction to Flexibility and Stiffness matrix methods of analysis using 'system approach' upto three degree of indeterminacy– Analysisofcontinuousbeamsincludingsettlementofsupportsusingflexibility and stiffnessmethods

UNIT-V

Stiffness Method of Analysis Analysis of pin-jointed determinate plane frames using stiffness methods- Analysis of single baysinglestoreyportalframeswithandwithout sideswayusingstiffnessmethod-Shearforce and bending moment diagrams - Elasticcurve.

TEXT BOOKS:

1. Structural Analysis Vol I & II by G.S. Pandit S.P. Gupta Tata McGrawHillEducation Pvt. Ltd. third *edition*
2. Advanced Structural Analysis by Ashok. K. Jain, Nem ChandBrothers.2nd *edition*

REFERENCES:

1. Basic Structural Analysis by C.S. Reddy, Tata Mc-Grawhill
2. Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
3. 3.Structural Analysis by S S Bhavikatti, VikasPublications.

19CE3173:ADVANCED FLUID MECHANICS

B.Tech. III Year I Sem.

L	T	P	C
3	-	-	3

Course Objectives: To learn

1. Introduce the concepts of fluid mechanics useful in Civil Engineering applications
2. Provide a first level exposure to the students to fluid statics, kinematics and dynamics
3. Learn about the application of mass, energy and momentum conservation laws for fluid flows
4. Train and analyse engineering problems involving fluids with a mechanistic perspective is essential for the civil engineering students
5. To obtain the velocity and pressure variations in various types of simple flows
6. To Discuss and analyze the open channels in uniform and Non-uniform flow conditions.
7. To Study the characteristics of hydroelectric power plant and its components.
8. To analyze and design of hydraulic machinery and its modeling

Course Outcomes: Upon completion of this course, students should be able to:

1. Understand the broad principles of fluid statics, kinematics and dynamics
2. Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow
3. Understand classifications of fluid flow
4. Be able to apply the continuity, momentum and energy principles
5. Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
6. Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
7. Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages

UNIT-I

Fluid Properties and Buoyancy: Review of fluid properties, compressibility, bulk modulus, cavitation, vapour pressure, fluid pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure-measurement of pressure – Manometers, types, derivations and problems; Buoyancy – stability of bodies for floating and submerged bodies, metacenter

UNIT-II

Flow Through Pipes: Reynolds experiment**,** variation of friction factor with Reynold's number, Total Energy Line, Hydraulic Gradient line, siphon, branching of pipes, three reservoir problem,power transmission through pipes, waterhammerin pipes and control measures.

UNIT-III

Flow Measurements and laminar flow: Flow through rectangular; triangular, trapezoidal and stepped notches and weirs with endcontractions; Velocity of approach, Flow through broad crested and ogee weir, flow through parallel plates and circular pipes.

UNIT-IV

Gradually Varied Flow: Non-uniformflow-Gradually Varied Flow - Dynamic equation for G.V.F; Classification of channel bottomslopes – Classification and characteristics of Surface profiles, Computation of water surfaceprofilesby Direct step method.

UNIT-V:

Rapidly Varied Flow: Elements and characteristics (Length and Height) of Hydraulic jump in rectangular channel–Types, applications and location of hydraulic jump, Energy dissipation and other uses –Positiveand NegativeSurges (Theory only).

TEXT BOOKS:

1. Fluid Mechanics and Hydraulic Machines by Dr.R.K. Bansal,Laxmi Publications2015
2. FluidMechanics andHydraulicMachinesbyModiandSeth,StandardBook house

REFERENCES:

1. Streeter,V.L.andWylieE.B.,“FluidMechanics”,McGrawHillPublishingCo.2010
2. Openchannelflow byV.T.Chow (McGrawHill BookCompany)
3. HydraulicMachinesbyBanga& Sharma(KhannaPublishers) 6th edition

19CE3174: IRRIGATION AND HYDRAULIC STRUCTURES

B.Tech. III Year I Sem

L	T	P	C
3	-	-	3

Course Objectives:

To study various types of storage works and, diversion headwork, their Components and design principles for their construction.

Course Outcomes: At the end of the course, the student will be able to:

1. Know types of water retaining structures for multiple purposes and its key parameters Considered for planning and designing
2. Understand details in any irrigation System and its requirements Know, Analyze and Design of a irrigation system components

UNIT - I

Storage Works- Reservoirs-Typesofreservoirs,selectionofsiteforreservoir,zonesofstorage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation–LifeofReservoir.Typesofdams,factorsaffectingselectionoftypeofdam,factorsgoverning selection of site for a dam.

UNIT - II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile, and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety – Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT- III

Earthdams:TypesofEarthdams,causesoffailureofearthdam,criteriaforsafedesignofearth dam,seepage through earth dam-graphical method, measures for control of seepage. Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT- IV

DiversionHeadworks:TypesofDiversionheadworks-weirsandbarrages,layoutofdiversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations-Silt Ejectors and Silt Excluders Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT- V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.Canal regulation works, principles of design of cross and distributary head regulators, types of Canalescapes - types of canal modules, proportionality, sensitivity, setting and flexibility. Cross Drainageworks: types, selection of suitable type, various types, design considerations for cross drainage works

TEXT BOOKS:

1. Irrigation Engineering and Hydraulic structures by Santhosh kumar Garg, Khanna Publishers.3rd edition
2. Irrigation engineering by K. R. Arora StandardPublishers.
3. IrrigationandwaterpowerengineeringbyPunmia&Lal,LaxmipublicationsPvt.Ltd.,New Delhi

REFERENCES:

1. Theory and Design of Hydraulic structures by Varshney, Gupta &Gupta
2. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers2015.
3. Irrigation Theory and Practice by A. M. Micheal Vikas Publishing House 2015.
4. IrrigationandwaterresourcesengineeringbyG.L.Asawa,NewAgeInternationalPublishers

19MC0005 PROFESSIONAL ETHICS

B.Tech. III Year I Sem.

L	T	P	C
2	-	-	0

Course Objective:

To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcome:

The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT - I

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT - II

Basic Theories: Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

UNIT - III

Professional Practices in Engineering: Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT - IV

Work Place Rights & Responsibilities, Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation. Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

UNIT - V

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCES:

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

19CE3151 SOIL MECHANICS LAB

B.Tech. III Year I Sem.

L	T	P	C
-	-	3	1.5

Course Objectives:

To obtain index and engineering properties of locally available soils, and to understand the behavior of these soil under various loads.

Course Outcomes:

At the end of the course, the student will be able to Classify and evaluate the behavior of the soils subjected to various loads.

LIST OF EXPERIMENTS

1. Atterberg Limits (Liquid Limit, Plastic Limit, and shrinkagelimit)
    a) Field density by core cutter methodand
    b) Field density by sand replacement method
2. Grain sizedistribution
3. Specific gravity and Differential free swell index (DFSI) test
4. Permeability of soil by constant and variable head test methods
5. Standard Proctor's CompactionTest
6. Determination of Coefficient ofconsolidation
7. Unconfined compressiontest
8. Direct sheartest
9. Vane sheartest
10. Tri-axial compressiontest

REFERENCE:

1. Measurement of Engineering Properties of Soils by. E. Saibaba Reddy & K. Rama Sastri, New Age International
2. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.

19CE3152: CONCRETE TECHNOLOGY LAB

B.Tech. III Year I Sem.

L	T	P	C
-	-	3	1.5

Course Objectives: The objectives of the course are to

- To learn laboratory tests and their procedures cement, fine aggregate, courseaggregates
- To Evaluate Fresh and Hardened concreteproperties

Course Outcomes: Student shall be able to

- Categorize the test on materials used Civil EngineeringBuilding.
- To perform the tests on concrete for itcharacterization.
- To Design Concrete Mix Proportioning by Using Indian StandardMethod.
- To prepare a laboratoryreport

Test on Cement

1. Normal Consistency and fineness ofcement.
2. Initial setting time and final setting time ofcement.
3. Specific gravity ofcement
4. Soundness ofcement
5. Compressive strength ofcement.

Test on Aggregates (Coarse andFine)

1. Specific gravity (Pycnometer and wire basket), waterabsorption
2. SieveAnalysis
3. Bulking of sand

Test on FreshConcrete

1. Slumptest
2. CF (Compaction FactorTest)
3. Vee-beeTest
4. Flow TableTest

Test on hardenedconcrete

1. Compression test on Cubes
2. Flexuretest
3. Split TensionTest
4. Non-Destructive Tests onConcrete
5. ReboundHammer
6. Ultrasound Pulse Velocity(UPV)

TEXT BOOKS:

1. Concrete Technology by M.S Shetty – S.Chand &Co.
2. Concrete Manual by M.L. Gambhir, Dhanpat Rai &Sons.

IS CODES:

1. IS 10262 :2009 “Concrete Mix Proportioning –Guidelines”
2. 1S 516:2006 “Methods of Tests on Strength ofConcrete”
3. IS 383 :1993 “Specification For Coarse And Fine Aggregates From Natural Sources ForConcrete”

19CE3153: BUILDING INFORMATION MODELING LAB

B.Tech. III Year I Sem

L	T	P	C
-	-	2	1

Course Objectives:

- To create Building Information Modelling solutions for architecture
- To accomplish Building Information Modelling concepts using required architectural software tools

Course Outcomes:

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

- Develop high quality, more accurate architectural designs.
- Visualize the components of building with understanding of levels in BIM
- Use tools specially built to support Building Information Modelling workflows
- Learn to capture analyze concepts and maintains vision through design, documentation and construction
- Develop designs for exterior and interior view of a building

CONTENT:

1. Hands-on 3D Modelling of building components in Revit
2. Hands-on Development of a new project in Revit
3. Hands-on 3D visualization, Rendering and walkthrough
4. Hands-on Model based scheduling
5. Hands-on Model based cost estimation
6. Hands-on 4D Simulation using MS Project

REFERENCE:

1. Autodesk Revit 2022 Architecture fundamentals by ASCENT

19MB3211: BUSINESS ECONOMICS & FINANCIAL ANALYSIS

B.Tech III Year II Semester

L	T	P	C
3	-	-	3

CourseObjective:

1. To learn the basic Business types, impact of the Economy on Business and Firms specifically.
2. To analyze the Business from the FinancialPerspective.

Course Outcome:

1. The students will understand the various Forms of Business and the impact of economic variables on the Business.
2. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
3. The Students can study the firm's financial position by analysing the Financial Statements of aCompany.

UNIT – I:Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Conceptsand Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II:

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT- III:

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly,Oligopoly, and Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

UNIT - IV

FinancialAccounting: AccountingconceptsandConventions,AccountingEquation,Double- Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, and Preparation of FinalAccounts.

UNIT - V

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd.2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill,2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press,2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications,2013.

19CE3212-DESIGN OF REINFORCED CONCRETE STRUCTURES

B.Tech. III Year II Sem.

	L	T	P	C
Course Objectives: The objectives of the course are to	3	-	-	3

1. Identify the basic components of any structural system and the standard loading for the RC structure
2. Identify and tell the various codal provisions given in IS.456
3. Describe the salient feature of limit state method, compare with other methods and the concepts of limit state of collapse and limit state of serviceability
4. Evaluate the behaviour of RC member under flexure, shear and compression, torsion and bond.

Course Outcomes: After the completion of the course student should be able to

1. Compare and Design the singly reinforced, doubly reinforced and flanged sections.
2. Design the axially loaded, uniaxial and biaxial bending columns.
3. Classify the footings and Design the isolated square, rectangular and circular footings
4. Distinguish and Design the one-way and two-way slabs.

UNIT – I

Design philosophies-Working Stress Method (WSM), Ultimate Load Method (ULM), and Limit State Method (LSM) – Material - Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS 456:2000 codal provisions.

Limit state analysis and design of singly reinforced, doubly reinforced, Flanged sections- Tand L beam sections.

UNIT – II

Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length along with I.S. code provisions. Limit state of serviceability for deflection and cracking.

Design of cantilever, simply supported and continuous beams with detailing.

UNIT – III

Design of one-way slab, Two-ways slabs and continuous slab Using IS Coefficients, Design of dog legged staircase.

UNIT – IV

DesignofaxiallyloadedShortrectangularandcircularcolumns,Designofcolumnsunderuni- axial bending and bi-axial bending using SP-16 charts, Design of slendercolumns

UNIT - V

Different types of footings,design loads for foundation, Design of isolated-Square, rectangular and circular footings and design of combined footings.

TEXT BOOKS:

1. **Reinforced Concrete Design: Principles and Practice** N. Krishna Raju and R.N.Pranesh New age International Publishers, New Delhi, 4th Edition, 2018.
2. **Reinforced concrete design** by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill, NewDelhi.
3. **Limit state designed of reinforced concrete** – P. C. Varghese, Prentice Hall of India, NewDelhi.

REFERENCES:

1. **Reinforced concrete design** by N. Subrahmanian Oxford UniversityPress.
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar —**Reinforced concrete structures**, Vol.1, Laxmi publications Pvt. Ltd., 3rd Edition,2011.
3. P. Purushotham — **Reinforced concrete structural elements–behaviour, Analysis and design**, Tata Mc. Graw-Hill, 3rdEdition,2014.
4. **Design of Reinforced Concrete Structures** by I. C. Syal and A. K. Goel, S. Chand & company.
5. **Fundamentals of reinforced concrete** by N.C. Sinha and S.K Roy, S. Chandpublishers
6. **Design of concrete structures** – Arthus H. Nilson, David Darwin, and Chorles W. Dolar, Tata McGraw-Hill, 3rd Edition, 2005

7. M.L. Gambhir —**Fundamentals of Reinforced concrete design**, Printice Hall of India Private Ltd., New Delhi, 3rd Edition, 2006.

CODE BOOKS

1. IS 456 : 2000 Plain and Reinforced Concrete-Code ofPractice
2. SP-16 Design Aids for ReinforcedConcrete

E-RESOURCES:

1. https://en.wikipedia.org/wiki/Reinforced_concrete
2. http://www.bd.gov.hk/english/documents/code/CoP_SUC2013e.pdf
3. http://www.sturdystructural.com/reinforced-concrete.html
4. http://engineeringvideolectures.com/course/294
5. http://www.nptel.ac.in/courses/105105105/
6. http://www.nptel.ac.in/courses/105105104/

19CE3213: ENVIRONMENTAL ENGINEERING

B.Tech. III Year II Sem.

L	T	P	C
3	-	-	3

Course Objectives: To learn

1. various water supply schemes and forecasting methods ofPopulation.
2. To gain the knowledge of water treatment units and distributionsystems
3. To acquire knowledge on characteristics and disposal ofsewage
4. To gain the knowledge on treatment units and stages in waste water treatmentplant

Course outcomes: After learning the contents of this paper the student must be able to

1. Explain the water supply schemes and Forecastingmethods
2. Apply the design considerations for treatment plantunits
3. operate the different stages involved in waste water treatment.

UNIT- I

Introduction: water supply schemes, protected water supply, population forecast, design period, water demand, Types of demand, factors affecting, fluctuations, fire demand, sources of water, intakes, infiltration galleries, confined and unconfined aquifers, water quality parameters & testing, drinking water standards.

UNIT - II

Layout and general outline of water treatment units, sedimentation, uniform settling velocity, principles,design factors,surface loading, Jartest, optimum dosage of coagulant, coagulation, flocculation clarifier design, coagulants, feeding arrangements.

Filtration, theory, working of slow & rapid gravity filters, multimedia filters, design of filters, troubles in operation, comparison of filters, disinfection types of disinfection, theory of chlorination, chlorine demand, other disinfection treatmentmethods.

UNIT-III

Distribution systems, types of layouts of distribution systems, design of distribution systems, Hardy cross and equivalent pipe methods, service reservoirs, Conservancy and water carriage systems, sewage and storm water estimation, time of concentration, Storm water overflows combined flow, characteristics of sewage , examination of sewage, B.O.D.,C.O.D. equations. Design of sewers, shapes and materials, sewer appurtenances, manholes, inverted siphon, catch basins, flushing tanks, ejectors, pumps and pump houses, house drainage, components requirements, sanitary fittings, traps, one pipe and two pipe systems of plumbing.

UNIT - IV

Layout and general outline of various units in a waste water treatment plant, primary treatment design of screens , grit chambers, skimming tanks, sedimentation tanks, principles and design of biological treatment, trickling filters, standard and high rate., ASP, ASP modification, aeration.

UNIT -V

Construction and design of oxidation ponds, oxidation ditches. sludge treatment Sludge digestion tanks, design of Digestion tank, factors affecting sludge digestion, Sludge disposal by drying, Elutriation of Sludge , septic tanks working principles and design, soak pits. Ultimate disposal of waste water- self-purification of rivers, sewage farming.

TEXT BOOKS:

1. Environmental Engineering, I and II by BC Punmia, Std.Publications.
2. Environmental Engineering, I and II by SK Garg, KhannaPublications.

REFERENCES:

1. Water and Waste Water Technology by Steel,Wiley

2. Waste water engineering by Metcalf and Eddy, McGraw Hill, 2015.
3. Water and Waste Water Engineering by Fair Geyer and Okun, Wiley,2011
4. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.Wiley, 2007.
5. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, NewJersey.
6. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition2008.
7. Integrated Solid Waste Management, Tchobanoglous, Theissen & Vigil. McGraw Hill Publication

19CE3271-ENGINEERING MATERIAL FOR SUSTAINABILITY

B.Tech. III Year II Sem.

L	T	P	C
3	-	-	3

Course objectives:

1. Describe the housing strategies for the urban poor
2. Identify the various technology and their applications in sustainable Housing
3. Describe different sustainable alternative materials for construction
4. Describe construction in disaster prone areas

Course outcomes: After completion of the course, the student should be able to

1. Decide the type o f Schemes for housing the urban poor
2. Develop the suitable sustainable construction techniques in Housing.
3. Apply knowledge of innovative cost-effective construction techniques
4. Describe different sustainable alternative materials for construction low-cost Infrastructure services
5. Decide the type of construction in Disaster Prone areas for different Engineering structures

UNIT – I:

Housing the Urban Poor: Introduction- Living conditions in slums- Approaches and strategies for housing urban poor.

Alternative Building Materials for Sustainable Construction: Introduction- Substitute for scarce materials- Ferro-cement- Gypsum boards- Timber substitutions- Industrial wastes- Agricultural wastes – cement-soil blocks for masonry – stabilized mud construction.

UNIT – II:

Development and Adopting Sustainable Construction Technology: Introduction- Adoption of innovative cost effective construction techniques- Adoption of pre-cast elements in partial prefabrication- Adopting of total prefabrication of mass housing in India- General remarks on pre cast rooting/flooring systems- Economical wall system- Single Brick thick loading bearing wall- 19cm thick load bearing masonry walls- Half brick thick load bearing wall- Fly ash-gypsum brick for masonry- Stone Block masonry- Adoption of pre-cast R.C. plank and join system for roof/floor in the building.

UNIT – III:

Low-Cost Infrastructure Services: Introducing- Present status- Technological options- Low cost sanitation's- Domestic wall- Water supply- energy.

UNIT – IV:

Rural Housing: Introduction- traditional practice of rural housing continuous- Mud Housing technology- Mud roofs- Characteristics of mud- Fire resistant treatment for thatched roof- Soil stabilization- Rural Housing programs.

UNIT – V:

Construction in Disaster Prone Areas: Introduction- Earthquake- Damages to houses- Traditional Housing in disaster prone areas- Type of Damages of non-engineered buildings- Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions- Requirements of structural safety of thin pre-cast roofing units against - Earthquake forces- Status of R& D in earthquake strengthening measures- Floods- cyclone- future safety.

TEXTBOOKS:

1. Modern Trends in Housing in Developing Countries by A.G.Madhava Rao, D.S.Ramachandra Murthy & G.Annamalai
2. Properties of Concrete by A.M.Neville, Pearson Publishing Limited, London

REFERENCES:

1. Building Materials for Low–Income Houses, International Council for Building Research Studies and Documentation.

2. Handbook of Low-Cost Housing by A.K.Lal, New Age International Publishers.
3. Light Weight Concrete by Academic kiado,Rudhai G.,Publishing Home of Hungarian Academy of Sciences, 1963.
4. Low-Cost Housing by G.C.Mathur

19CE3272: ADVANCED STRUCTURAL DESIGN

B.Tech. III Year II Sem.

	L	T	P	C
Course Objectives:	3	-	-	**3**

1. To make the student more conversant with the design principles of critical structures using limit stateapproach

Course outcomes:

At the end of the course the student will able to:

1. Enhance the capabilities to design the special structural elements as per Indian standardcodeof practice.
2. Analyze, design, draw and detailing of critical structural components with a level of accuracy

UNIT – I

Design and Detailing of cantilever type of Retaining walls – Stability Check. Principles & Design of Counter fort Retaining walls.

UNIT – II

Flatslabs: Direct design method–Distribution of moments in column strips and middle strip- moment and shear transfer from slabs to columns – Shear in Flat slabs-Check for one wayand two wayshears

Ribbed slabs: Analysis of the Slabs for Moment and Shears, Ultimate Moment of Resistance, Design for shear, Deflection, Arrangement of Reinforcements.

UNIT – III

Design of RCC Circular Water Tanks.

UNIT – IV

Introduction - Definition and basic forms – Components of a bridge - Classification of bridges IRC Loading Standards and specifications - Design of Reinforced Concrete Slab Bridge decks

UNIT – V

Introduction: Definition, components of bridge, classification of bridges, selection of site, economical span, aesthetics consideration, necessary investigations and essential design data. Standard Specifications for Roads and Railways Bridges: General, Indian Road Congress Bridge Code, width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges, detailed explanation of IRC standard live loads.

TEXT BOOKS:

1. Advanced RCC by Krishna Raju, CBS Publishers & distributors, NewDelhi.
2. Advanced RCC by Varghese, PHI Publications, NewDelhi.
3. Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ. Press, NewDelhi
4. R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, NewDelhi

REFERENCES:

1. RCC Designs by Sushil Kumar, standard publishinghouse.
2. Fundamentals of RCC by N.C. Sinha and S.K. Roy, S. Chand Publications, NewDelhi.
3. N. Krishna Raju, Design of Bridges, Oxford & IBH Publishing Company Pvt. Ltd, New Delhi. Fourth edition2009.

19CE3273 FOUNDATION ENGINEERING

B.Tech. III Year II Sem.

L	T	P	C
3	-	-	3

Course Objectives:

1. To Plan Soil exploration programme for Civil EngineeringProjects
2. To check the stability ofslopes
3. To determine the lateral earth pressures and design retainingwalls
4. To determine the Bearing capacity ofSoil
5. To design pile groupfoundation

Course Outcomes: At the end of the course the student will able to

1. understand the principles and methods of GeotechnicalExploration
2. decide the suitability of soils and check the stability ofslopes
3. calculate lateral earth pressures and check the stability of retainingwalls
4. analyse and design the shallow and deepfoundations

UNIT – I

Soil exploration: Need – methods of soil exploration – boring and sampling methods penetration tests – plate load test– planning of soil exploration programme, Bore logs and preparation of soil investigationreport.

UNIT – II

Slope stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices–Taylor's Stability Number-stability of slopes of earth dams under different conditions.

UNIT – III

Earth pressure theories: Active, Passive and at rest soil pressures - Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory.

Retaining walls: Types of retaining walls–stability of gravity and cantileverretaining walls against over turning, sliding and, bearing capacity, filter material fordrainage.

UNIT – IV

Shallow foundations- Types - choice of foundation – location and depth - safe bearing capacity – shear criteria – Terzaghi's, and IS code methods - settlement criteria – allowable bearing pressure based on SPT N value and plate load test – allowable settlements of structures.

UNIT – V

Pile foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction.

Well foundations: Types – different shapes of wells – forces on wells - components of wells – sinking of wells – tilts and shifts.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao,New age International Pvt Ltd, NewDelhi
2. Principals of Geotechnical Engineering by Braja M. Das, Cengage LearningPublishers.

REFERENCES:

1. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
2. Geotechnical Engineering Principles and Practices by Cuduto, PHIInterna

19CE3274-AIR POLLUTION AND CONTROL

B.Tech. III Year II Sem

	L	T	P	C
CourseObjectives: Tolearn	3	-	-	**3**

1. To impart the knowledge on sources and pollutants that are responsible for air pollution
2. To understand the effects of air pollution on human and environments.
3. To pursue knowledge of plume behaviour and meteorology conditions.
4. To learn various control techniques to measure and reduce particulate matter
5. To learn various control techniques to measure and reduce gaseouse missions various standards and management techniques to control air pollution.

Courseoutcomes: After learning the contents of this paper the student must be able to

1. Identify various sources and pollutants that effect human and environment through air pollution
2. Identify plume behavior and will suggest when and how to release air pollution.
3. Suggest control techniques to reduce particulate matter.
4. Suggest control techniques to reduce gaseouse missions.
5. Suggest standards to control and manage air pollution

UNIT -I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Lineand Areal Sources of air pollution-stationary and mobile sources.

UNIT – II

Effects of Air pollutants on man, material and vegetation; Global effects of airpollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.- Case studies on effects of Airpollution.

UNIT - III

Thermo dynamics and Kinetics of Air-pollution – Applications in the removal ofgases like SOx; NOx; CO; HC etc., air-fuel ratio. Computation and Control of products ofcombustion. Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure,Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality wind rose diagrams.

UNIT – IV

Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion. Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electro static precipitators.

UNIT–V

General Methods of Control of Nox and SOx emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling. Air Quality Management– Monitoring of SPM, SOx; NOx and CO Emission Standards.

TEXT BOOKS:

1. Air pollution By M. N. Rao and H. V. N. Rao – Tata McGraw HillCompany.
2. AirpollutionbyWark andWarner.- Harper& Row,NewYork.

REFERENCE:

1.Air pollution and control ByK.V.S.G.Murali Krishna, Kaushal Publishers. Kakinada

19CE3251: ADVANCED SURVEYING LAB

B.Tech. III Year II Sem.

L	T	P	C
-	-	3	1.5

Course Objective:

1. To impart the practical knowledge in the field to set out any Civil Engineering work

Course Outcome:

1. Perform surveying on any civil engineering work

TOTALSTATION:

1. Study of Instrument – Determination of Distances, Directions andElevations
2. Determination of Boundaries of a Field and computation ofarea.
3. Determination of Heights of objects.

SETTING OUT OFCURVES:

1. Setting of simple curve usingchain
2. Setting of simple curve usingtheodolite.
3. Setting of a simple curve using TotalStation.

LAYOUT OFBUILDING:

1. Setting out for Building by using tape and crossstaff.
2. Setting out for Building by using Total station.

Survey Camp is to beconductedUsingTotal Station to train in one of the following areas:

2. Preparation of a contour Plan/Map.
3. Earth work Computations for a high way / canalprojects
4. Marking of a Sewer line/ Water supplyline.
5. Any type of Execution work

19CE3252- ENVIRONMENTAL ENGINEERINGLABORATORY

B.Tech. III Year II Sem.

L	T	P	C
-	-	3	1.5

Course Objectives: The objectives of the course are to Perform the experiments

1. To determine water and waste waterquality
2. Understand the water & waste water sampling, their qualitystandards
3. Estimate quality of water, wastewater

Course outcomes: After the completion of the course student should be able

- To Understand about the equipment used to conduct the testprocedures
- To Perform the experiments in thelab
- To Examine and Estimate water, waste water and EnvironmentalQuality
- Develop a report on the quality aspect of theenvironment

Practical Work: List of Experiments

1. Determination ofpH
2. Determination of Electrical Conductivity
3. Determination of Total Solids (Organic andinorganic)
4. Determination ofAcidity/Alkalinity
5. Determination ofTurbidity
6. Determination of Hardness (Total, Calcium and MagnesiumHardness)
7. Determination ofChlorides
8. Determination of optimum coagulantDosage
9. Determination of Dissolved Oxygen (WinklerMethod)
10. Determination ofCOD
11. Determination ofBOD/DO
12. Determination of Residual Chlorine
13. Total countNo.
14. Noise level measurement

References:

1. Manual on Water Supply and Treatment. Ministry of Urban Development, NewDelhi
2. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. Environmental Engineering, Mc-Graw - Hill International Editions, New York1985.
3. MetCalf and Eddy. Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGrawHill, NewDelhi.

19HS3251: ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B.Tech. III Year II Sem.

L	T	P	C
-	-	2	1

Introduction

A course on Advanced English Communication Skills (AECS) Lab is considered essential at the third year level of B.Tech and Pharmacy courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements.

Course Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

1. To improve students' fluency in spoken English
2. To enable them to listen to English spoken at normal conversational speed
3. To help students develop their vocabulary
4. To read and comprehend texts in different contexts
5. To communicate their ideas relevantly and coherently in writing
6. To make students industry-ready
7. To help students acquire behavioural skills for their personal and professional life
8. To respond appropriately in different socio-cultural and professional contexts

Course Outcomes: Students will be able to:

1. Acquire vocabulary and use it contextually
2. Listen and speak effectively
3. Develop proficiency in academic reading and writing
4. Increase possibilities of job prospects
5. Communicate confidently in formal and informal contexts

The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

UNIT-I:Inter-personal Communication and Building Vocabulary –Starting a Conversation–Responding Appropriately and Relevantly –Using Appropriate Body Language –Role Play in Different Situations – Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.

UNIT-II: Reading Comprehension –General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, , Skimming, Scanning, Inferring Meaning.

UNIT-III: Writing Skills –Structure and Presentation of Different Types of Writing –Letter Writing/Resume Writing/ e-correspondence/ Technical Report Writing.

UNIT-IV: Presentation Skills –Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/ emails/Assignments…etc.,

UNIT-V: Group Discussion and Interview Skills –Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation-Concept and Process, Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

REFERENCES:

• Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.

• Konar, Nira. English Language Laboratories –A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011

19CE3291: TECHNICAL PAPER PRESENTATION

B.Tech. III Year II Sem. **L T P C**

0 0 2 1

GENERAL INSTRUCTIONS

1. **Pick The Right Topic**: Make sure that you find this topic genuinely interesting, or find some aspect of it that is especially cool.

2. **Skim Your Textbook:** Look over the syllabus, read the newspapers regularly, look through recent issues of relevant journals and magazines, surf the net, watch the Technical news, talk to your classmates and friends to get innovative Ideas.

3. **Narrow down Your Topic**: Many good ideas are wasted because students have a hard time focusing on a narrow enough topics. If your topic is way too broad, try homing in on some part of that topic, and exploring that area in more depth.

4. **My Topic is Too Narrow**: Generalize to similar or related topics (cloning of humans vs. cloning of animals, unexpected social problems that might result from cloning, technical aspects of cloning, moral or religious issues related to cloning, etc.). But keep your focus clear throughout

5. **Organize Your Thoughts In A Good Outline**: Outlining is a genuine pain, especially in the early stages of your paper, by forcing you to come in terms of writing the topic. Try to reveal major deficiencies in your approach. Use it on your first draft to get your bearings, or on your final draft to check the way you've organized your paragraphs.