



SARDAR PATEL UNIVERSITY, BALAGHAT (MP)

School of Engineering and Technology

Syllabus

Course: B. Tech.

Branch: Civil Engineering

Semester: VIIth

Academic Session: 2024-25

w.e.f - Date-02-09-2024

BCE071 Advance Structural Design-I (RCC)

Course Content

Course Objectives:

1. To give graduates with a sound background of the design of reinforced concrete structures,
2. An understanding of selected advanced topics in the field including the use of new concepts, construction techniques and materials.
3. The course also provides a revision of some of the fundamental principles of reinforced concrete design.
4. In particular, the course addresses short and long-term deflections, creep, shrinkage, ductility, section analysis, prestressing, shear and cracking.

Unit-I

Design of Multistory Buildings: Sway and non-sway buildings, shear walls and other bracing elements.

Unit-II

Earth Retaining Structures: Introduction, Design of Cantilever and counter fort type retaining walls.

Unit-III

Water Tanks: Design of Tanks on ground and underground tanks: square, rectangular, circular tanks, overhead tanks: circular and intze tanks.

Unit-IV

Silos and Bunkers: Introduction, design of rectangular, square and circular bunkers, design of silos by Airy's theory and Janssen's theory.

Unit-V

T-Beam & Slab Bridges for highway loading (IRC Loads Pre-stressed Concrete, Introduction to Pre-stressed Concrete, Pre-tensioning and Post-tensioning, Different Systems, Losses in Pre-stress, Permissible stress in Concrete and Steel, Design of Simply supported beam with symmetrical sections, use of IS code

Course Outcome:

- CO1 Explain sway and non-sway buildings, shear walls.
- CO2 Analysis of retaining walls.
- CO3 Analysis of various types water tanks
- CO4 Analysis of various types silos and bunkers.
- CO5 Analysis of various types T-beam & slab bridges.

Reference Books:

1. R.C.C. by O.P. Jain Vol. II
2. R.C.C. by B.C. Punmia
3. Essentials of Bridge Engineering – D.J. Victor
4. Bridge Engineering - Ponnuswamy
5. Advanced R.C.C. Design by N.K. RAJU
6. N.Krishna Raju, Prestressed Concrete, Tata McGraw Hill, New Delhi.
7. Pre stresses concrete – T.Y. Lin Relevant IS codes



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BCE072 Structural Design–II (STEEL)

Course Content

Course Objectives:

1. To know about the merits of steel structures.
2. To know about shapes and grades of structural steel available.
3. To understand the behavior of structural steel under tension, compression and flexure.
4. Understand the behavior of plate girders.
5. Understand the behavior of column bases and gantry girders.

Unit- I

Various loads and mechanism of the load transfer, partial load factors, structural properties of steel, Design of structural connections - bolted, riveted and welded connections.

Unit- II

Design of compression members, tension members, roof trusses –angular & tubular, lattice girders.

Unit - III

Design of simple beams, built- up beams, plate girders and gantry girders.

Unit - IV

Effective length of columns, design of columns-simple and compound, lacings and battens. Design of footings for steel structures, grillage foundation.

Unit - V

Design of industrial building frames, multistory frames, bracings for high rise structures, design of transmission towers.

Note: - All the designs for strength and serviceability should strictly be as per the latest version of IS:800.

Course Outcome:

- CO1 Illustrate design philosophies, analyze and design riveted connection in steel structures.
Analyze and design connections in steel structures.
- CO2 Analyze and design tension members, compression members and column bases, roof truss, girders.
- CO3 Illustrate Design of beams, calculate load on roof truss and analyze roof truss by graphical method, plate girders.
- CO4 Analysis of various types of columns, prepare drawings of laced and battened

columns and column bases applying principles of LSM.
CO5 Analysis of building frames, transmission towers.

Reference Books :

1. Design of steel structures by Arya & Azmani Nemchand & Bros, Roorkee.
2. Design of steel structures by P. Dayaratnam.
3. Design of steel structures Vol. I & II by Ramchandra.
4. Design of steel structures by L.S. Negi.
5. Design of steel structures by Ramammutham.
6. Design of steel structures by Punmia.
7. Design of steel structures –N. Subramanian.
8. Relevant IS codes.



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BCE073 Advance Construction Technique & Equipment

Course Content

Course Objectives:

1. To study and understand the properties of modern construction materials used
2. Construction such as special concretes, metals, composites, water proofing compounds,
3. Non-weathering materials, and smart materials.

Unit-I

Modern Construction Materials: Study of advance building materials like, aluminum, glass, fabric, various types of finishes & treatments, construction chemicals – sealants, engineering grouts, mortars , admixtures and adhesives

Unit-II

Polymers in Civil Engineering- structural plastics and composites- polymer membranes coatings- adhesives, non - weathering materials-flooring and facade materials- glazed brick, photo catalytic cement, acid etched copper and composite fiber metals-metals and special alloys of steel - water jet cut stainless steel, mill slab steel, tension rods assemblies and cast iron, heat treatment in steels, tendons.

Unit-III

Construction Methods: Sub-Structure Construction Techniques: Box jacking -Pipe Jacking- Under Water Construction of diaphragm walls and basement -Tunnelling techniques piling techniques-driving well and caisson-sinking cofferdam-cable anchoring and grouting driving diaphragm walls,

Super Structure Construction: Vacuum Dewatering of concrete flooring-Concrete paving technology-Techniques of construction for continuous concreting operation in Tall buildings of various shapes and varying sections .Launching techniques for heavy decks in situ prestressing in high rise structures. reinforcing steel: types, bending, placing, splicing and spacing, tendons.

Unit-IV

Construction Equipment's: equipment for excavating, dredging, trenching, tunneling, drilling, blasting-equipment for compaction-erection equipment- types of pumps used in construction-equipment for dewatering and grouting-foundation and pile driving equipment forklifts and related equipment-portable material -conveyors-hauling equipment.

Unit-V

Smart Materials: concept and types, sensing technology-types of sensors -physical measurement using piezoelectric strain measurement, piezoelectric and electrostrictive material - magneto structure material, shape memory alloys, electro rheological fluids.

Course Outcome:

- CO1 To understand various advance building materials, finishes and construction chemicals.
CO2 Illustrate structural plastics and composite polymers members, tendons.
CO3 To understand various construction techniques.
CO4 To understand various construction equipments, pile driving equipments.
CO5 To understand the concept of smart materials

Reference Books :

1. Shan Somayaji, Civil Engineering Materials 2nd Edition, Prentice Hall Inc., 2001.
2. Mamlouk M.S. and Zaniewski J.P., Materials for Civil and Construction Engineers, PrenticeHall Inc., 1999.
3. Derucher K., Korfiatis G. and Ezeldin S., Materials for Civil and Highway Engineers ",Prentice Hall Inc., 1999. 4th Edition
4. Peurifoy R.L., Ledbetter W. B.and Schexnayder C.,Construction Planning, Equipment andMethods ", 5th Edition, McGraw Hill, Singapore, 1995.
5. Sharma S.C. Construction Equipment and Management, Khanna Publishers New Delhi, 198



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BCE0741 Elective-III (1) Pavement Design

Course Content

Course Objectives:

1. Differentiate between flexible and rigid pavements, including their materials, structures, and applications.
2. Analyze the types of loads acting on pavements, including traffic loads, environmental factors, and their effects on pavement performance.
3. Identify and evaluate the properties of materials used in pavement construction, such as asphalt, concrete, and subgrade materials.
4. Apply various pavement design methods, such as the AASHTO design guide, the Mechanistic-Empirical Design guide, and local design standards.

Unit –I

Equivalent Single Wheel Load (ESWL): Definition, calculation of ESWL, repetition of loads and their effects on the pavement structures.

Unit –II

Flexible Pavements: Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque's theory, Burmister's two layered theory, methods of design, group index method, CBR method, Burmister's method and North Dakota cone method.

Unit –III

Rigid Pavements: Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard's stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.

Unit –IV

Rigid Pavement Design: IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.

Unit –V

Evaluation and Strengthening of Existing Pavements: Benkleman beam method, Serviceability Index Method. Rigid and flexible overlays and their design procedures.

Course Outcome:

- CO1 To understand equivalent single wheel load or their effects on the pavement Structures
- CO2 Illustrate the stress distribution through various layers, various methods of flexible pavement design
- CO3 Analyze the westergaard's stress theory stresses in rigid pavement, plate bearing test
- CO4 Illustrate IRC method of rigid pavement design, AASHTO Method, Reliability Analysis

CO5 To understand Benklemen beam method , Rigid and Flexible Overlays and their design procedures

Reference Books :

1. Principles of pavement design by E.J.Yoder& M.W. Witzak
2. AASHO, "AASHO Interim Guide for Design of Pavement Structures", Washington, D.C.
3. Portland Cement Association, Guidelines for Design of Rigid Pavements, Washington
4. DSIR, Conc. Roads Design & Construction
5. Srinivasan M. "Modern Permanent Way"



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BCE0742 Elective -III (2) Marine Construction

Course Content

Course Objectives:

1. Familiarize students with various marine environments and their impact on construction practices.
2. Teach fundamental design principles for marine structures, including docks, piers, and offshore platforms.
3. Instill knowledge of safety standards, environmental regulations, and best practices relevant to marine construction.
4. Develop skills in managing marine construction projects, including planning, scheduling, budgeting, and resource allocation.

Unit-I

Introduction: Introduction, History of water transportation at world level and at national level development and policy, classification of harbours, natural and artificial. Major ports in India, administrative set up.

Unit-II

Harbour Planning: Harbour components, ship characteristics, characteristics of good harbour and principles of harbour planning, size of harbour, site selection criteria and layout of harbours. Surveys to be carried out for harbor planning

Unit-III

Natural Phenomena: Wind, waves, tides formation and currents phenomena, their generation characteristics and effects on marine structures, silting, erosion and littoral drift.

Unit –IV

Marine Structures: General design aspects, breakwaters -function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories – function, types, suitability, design and construction features.

Unit –V

Docks And Locks: Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks -graving docks, floating docks.

Course Outcome:

CO1 To understand about the Introduction of marine construction.

CO2 To understand Harbour Planning Harbour components, ship characteristics

CO3 To understand Natural Phenomena Wind, waves, tides formation and currents phenomena

CO4 To understand Marine Structures General design aspects, breakwaters

CO5 To understand about the Docks and Locks.

Reference Books :

1. A course in docks and harbours: s. P. Bindra
2. Harbour docks and tunneling: r. Srinivasan
3. Dock and harbour engineering: oza



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BCE0743 Elective-III (3) Air and Noise Pollution Control

Course Content

Course Objectives:

1. The purpose of this course is to give the students an overview of air and noise pollution
2. Methods for prevention, control, measures and management of the pollution.

Unit-I

Introduction To Air Pollution Air Pollution, Definition, Air Pollution and Global Climate, Units of measurements of pollutants, Air quality criteria, emission standards, National ambient air quality standards , Air pollution episodes.

Unit-II

Sources Classification And Effects Sources and classification of air pollutants, Manmade, Natural sources, Type of air pollutants, Pollution due to automobiles, Analysis of air pollutants. Air pollution and its effects on human beings, plants and animals, Economic effects of air pollution.

Unit-III

Air Quality Sampling And Monitoring Ambient air sampling, tack sampling, instrumentation and methods of analysis of gaseous pollutants, Meteorology, legislation for control of air pollution and automobile pollution.

Unit-IV

Air Pollution Control Measures Control equipment, Particulate control methods, Bag house filter, Settling chamber, cyclone separators, inertial devices, Electrostatic precipitator, scrubbers, Control of gaseous emissions, Absorption, Absorption equipment's, adsorption and combustion devices.

Unit-V

Noise Pollution And Its Control Sources of noise, Units and Measurements of Noise, Characterization of Noise from Construction, Mining, Transportation and Industrial Activities, Airport Noise, Noise measuring equipment, Effects of noise pollution, Prevention and control of noise pollution.

Course Outcome:

- CO1 To understand about the Air Pollution, Definition, Air Pollution and Global Climate.
- CO2 To understand Sources and classification of air pollutants, Manmade, Natural sources.
- CO3 To understand Ambient air sampling, tack sampling, instrumentation and methods of analysis of gaseous pollutants.
- CO4 To understand air Control equipment, Particulate control methods, Bag house filter, Settling

chamber, cyclone separators, inertial devices, Electrostatic precipitator.
CO5 To understand Sources of noise, Units and Measurements of Noise, Characterization of Noise from Construction, Mining.

Reference Books :

1. C. S. Rao, "Environmental Pollution Control Engineering", Wiley Eastern Limited, 2000.
2. M. N. Rao, H. V. N. Rao, Air pollution, Tata McGraw Hill Pvt. Ltd, New Delhi, 1993.
3. G.K. Nagi, M.K. Dhillon, G.S. Dhaliwal, Commonwealth Publishers, Noise Pollution.
4. S.K. Garg, Khanna publishers, Sewage Disposal and Air Pollution Engineering.
5. S.M. Khopkar, Environmental pollution analysis, New Age International Publis.
6. method, Burmister's method and North Dakota cone method.



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BCE0744 Elective-III Cost-Effective & Eco-Friendly Construction

Course Content

Course Objectives:

1. Learn about eco-friendly materials and their benefits, including life cycle analysis and sourcing options.
2. Explore design strategies that reduce waste, energy use, and construction costs while maximizing functionality and aesthetics.
3. Gain knowledge in energy-efficient building techniques and technologies, such as passive solar design and insulation methods.
4. Explore emerging technologies and practices in eco-friendly construction, preparing students to adapt to industry changes.

Unit-I

Concepts of Energy Efficient & Environment Friendly Materials and Techniques: Cost effective materials: Soil, Fly ash, Ferro-cement, Lime, Fibers, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer. Energy Efficient & Environment friendly building material products: Walls - Stabilized and sun dried, soil blocks & bricks, Solid & Hollow concrete blocks, stone masonry blocks, Ferro cement partitions. Roofs – Pre-cast R.C. Plank & Joists roof, Pre-cast channel roof, Pre-cast L-panel roof, Pre-cast Funicular shells, Ferro cement shells, Filler Slab, Seasal Fibre roof, Improved country tiles, Thatch roof, M.C.R. tile. Green Materials, Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials

Unit-II

Cost Effective Construction Techniques And Equipments:- Techniques: Rat trap bond construction, Energy Efficient roofing's, Ferro cement technique, Mud Technology. Equipments: Brick moulding machine, Stabilized soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile making machine, Ferro cement wall panel & Roofing channel making machine, R.C.C. Chaukhat making m/c.

Unit-III

Cost Effective Sanitation: Waste water disposal system Cost effective sanitation for rural and urban areas Ferrocement Drains

Unit-IV

Low Cost Road Construction: Cost effective road materials, stabilization, construction techniques tests, equipment used for construction, drainage, maintenance.

Unit-V

Cost Analysis And Comparison:

- (a) All experimental materials
- (b) All experimental techniques Green Building rating systems

Course Outcome:

- CO1 To understand Cost effective materials: Soil, Fly ash, Ferro-cement, Lime, Fibers, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer.
- CO2 To understand Techniques Rat trap bond construction, Energy Efficient roofings, Ferro cement technique, Mud Technology.
- CO3 Illustrate Cost effective sanitation.
- CO4 Illustrate Low Cost Road Construction.
- CO5 To understand Cost analysis and comparison.

Reference Books :

1. Alternative Building Materials and Technologies – K S Jagadeesh, B V Venkatta RamaReddy & K S NanjundaRao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – AskoSarja –CRC Press
3. Non-conventional Energy Resources –D S Chauhan and S K Sreevasthava – New AgeInternational Publishers
4. Buildings How to Reduce Cost – Laurie Backer - Cost Ford
5. Lynne Elizabeth, Cassandra Adams Alternative Construction : Contemporary NaturalBuildingMethods ”, Softcover, Wiley & Sons Australia, Limited, John,2005
6. Givoni, “Man, Climate, Architecture, Van Nostrand, New York, 1976.
7. Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery,JohnWiley & Sons,2005.
8. Eugene Eccli- Low Cost, Energy efficient shelter for owner & builder, Rodale Press,1976



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BCE0751 Elective-IV Infrastructure Engineering

Course Content

Course Objectives:

1. Understand the principles of civil, structural, and environmental engineering as they apply to infrastructure systems.
2. Develop skills to design and analyze infrastructure projects, including roads, bridges, water supply systems, and waste management systems.
3. Explore sustainable engineering practices and the role of infrastructure in promoting environmental stewardship.

Unit-I

Infrastructure: Definitions of infrastructure, Governing Features, Historical overview of Infrastructure development in India, Infrastructure Organizations & Systems.

Unit-II

Infrastructure Planning: Typical infrastructure planning steps, Planning and appraisal of major infrastructure projects, Screening of project ideas, Life cycle analysis, Multi-criteria analysis for comparison of infrastructure alternatives, Procurement strategies, Scheduling and management of planning activities, Infrastructure Project Budgeting and Funding, Regulatory Framework, Sources of Funding.

Unit-III

Project Management In Construction: Introduction to project management processes - Initiating, Planning, Executing, Controlling, and Closing processes; Project Integration Management - Project plan development, Project plan execution, and Overall change control; Project Scope Management - Initiation, Scope planning, Scope definition, Scope verification, and Scope change control.

Unit-IV

Contracts And Management Of Contracts: Engineering contracts and its formulation, Definition and essentials of a contract, Indian Contract Act 1872, types of contracts and clauses for contracts, Preparation of tender documents, Issues related to tendering process, Awarding contract.

Course Outcome:

- CO1 To understand about the infrastructure, Governing Features, Historical overview of Infrastructure development in India, Infrastructure Organizations & Systems
- CO2 To understand infrastructure planning steps, Planning and appraisal of major infrastructure projects.

CO3 To understand Introduction to project management processes.

CO4 To understand Engineering contracts and its formulation, Definition and essentials of a contract, Indian Contract Act1872, types of contracts and clauses for contracts.

Reference Books :

1. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York, 2006.
2. J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London, 1999.
3. P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi, 2009.
4. S. M. Levy, Project management in construction, 5th ed., McGraw Hill, New York, 2007. PMI, A guide to the project management body of knowledge, 3rd ed., Project Management Institute, Pennsylvania, 1996.
5. M. Mawdesley, W. Askew and M. O'Reilly, Planning and controlling construction projects, Addison Wesley Longman Limited, Essex, 1997.
6. Vasant Desai, "Project Management", Himalaya Publishing , 1st Edition, 2010
7. Ronald W Hudson, "Infrastructure Management: integrating design, Construction, maintenance, rehabilitation and renovation", MGH, 1st Edition, 1997
8. Codes of Practice and Standard Specifications" of AP PWD, CPWD, MES etc.
9. Grig N. S., "Infrastructure Engineering and Management", Wiley- Interscience.



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BCE0752 Elective-IV Earthquake Resistant Design

Course Content

Course Objectives:

1. To expose the students to the analysis and design principles of Earthquake resistant structures using code provisions.
2. Explain the nature of seismic forces and their effects on structures.
3. Apply fundamental principles of earthquake engineering in the design process.

Unit-I

Engineering Seismology Introduction to engineering seismology, Geological and tectonic features of India, Origin and propagation of seismic waves, Earthquake measurement parameters, Characteristics of earthquake and its quantification- Magnitude and Intensity scales, Seismic instruments. Seismic zoning map of India.

Unit-II

Response Spectrum Response history and strong motion characteristics. Response Spectrum-elastic and inelastic response spectra, tripartite (D-V-A) response spectrum, use of response spectrum in earthquake resistant design. Computation of seismic forces in multi-storeyed buildings -using procedures as per codal provisions.

Unit-III

Seismic Structural Modeling Structural configuration for earthquake resistant design, Concept of plan irregularities and vertical irregularities, Soft story, Torsion in buildings. Design provisions for these in IS- 1893. Effect of infill masonry walls on frames, modeling concepts of infill masonry walls. Behaviour of masonry buildings during earthquakes, failure patterns, strength of masonry in shear and flexure, Slenderness concept of masonry walls

Unit-IV

Design Of Structure For Earthquake Resistance Seismic design philosophy, Load combinations, Ductility and energy absorption in buildings. confinement of concrete for ductility, design of columns and beams for ductility, ductile detailing provisions as per IS-1893. Lateral load resisting structural systems.

Unit-V

Seismic Control Of Structures Introduction, concept and types of seismic control systems as active, passive and semi- active systems. Requirements of efficient earthquake resistant structural system, damping devices, base isolation systems. Retrofitting of structures.

Course Outcome:

- CO1 Illustrate seismology, Earthquake measurement parameters, Seismic zone in map of india.
- CO2 To understand Response Spectrum- elastic and inelastic response spectra, tripartite (D-V-A) response spectrum,
- CO3 Analyze the Design provisions for these in IS-1893.Effect of infill masonry walls on frames, modeling concepts of infill masonry walls.
- CO4 Illustrate Design of columns and beams for ductility, ductile detailing provisions as per IS-1893. Lateral load resisting structural systems
- CO5 To understand concept and types of seismic control systems as active, passive and semi-active systems. Retrofitting of structures.

Reference Books :

1. Chopra Anil Kumar, Dynamics of Structures - Theory and Application to Earthquake Engineering, Pearson Education.
2. Hosur Vinod, Earthquake Resistant Design of Building Structures, Wiley (India).
3. Duggal, S. K., Earthquake Resistant Design of Structures, Oxford University Press.
4. Agarwal Pankaj, Shrikande Manish, Earthquake resistant design of structures, Prentice Hall of India, New Delhi India.
5. Pauley & Priestly, Seismic design of reinforced concrete and masonry buildings, John Wiley & Sons.
6. Stratta.J. L, Manual of Seismic Design, Prentice-Hall India Pvt Ltd.
7. Kramer.S. L., Geotechnical Earthquake Engineering, Prentice-Hall India Pvt Ltd.
8. All relevant IS codes.



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BCE0753 Elective-IV Urban & Town Planning

Course Content

Course Objectives:

1. Gain a comprehensive understanding of urban and town planning theories, principles, and practices.
2. Develop the ability to analyze complex urban issues, including land use, transportation, housing, and environmental sustainability.
3. Develop skills in urban design, including the creation of public spaces, streetscapes, and community layouts.

Unit-I

Definition And Classification Of Urban Areas – Trend of urbanization - Planning process - Various stages of the planning process - Surveys in planning. Plans - Delineation of planning areas. utility of spaces, future growth etc. Role of “Urban Planner” in planning and designing in relation with spatial organization, utility, demand of the area and supply

Unit-II

Plan Implementation- Urban Planning agencies and their functions - Financing- Public, private, Non governmental organizations- Public participation in Planning. Development control regulations. sustainability and rationality in planning, Components of sustainable urban and regional development, Emerging Concepts: Global City, inclusive city, Safe city, etc. City of the future, future of the city.

Unit-III

Town And Country Planning Act-Building bye-laws. Elements of City Planning, Zoning and land use, Housing. Introduction to landscaping, importance, objectives, principles, elements, Urban Planning standards Urban renewal for quality of life and livability.

Unit-IV

Traffic Transportation Systems: Urban road, hierarchy, traffic management, Intelligent Transport Systems. Legal Issues in Planning and Professional Practice, Concepts and contents related to planning provision regarding property rights, Concept of Arbitration, State and Central government to deal with various matters concerning Town and Country Planning. Mechanism for preparation of DP: Land Acquisition Rehabilitation and Resettlement Act 2013.

Unit-V

Types Of Development Plans: Master Plan, City Development Plan, Structure Plan, housing, land use, Water Supply & sanitation, etc., Planning agencies for various levels of planning. Their organization and purpose (CIDCO-MHADA-MIDC, MMRDA/ PMRDA etc).

Course Outcome:

- CO1 To understand Trend of urbanization - Planning process - Various stages of the planning process.
- CO2 To understand Urban Planning agencies and their functions
- CO3 To understand Building bye-laws. Elements of City Planning, Zoning and land use, Housing. Introduction to landscaping, importance
- CO4 To understand urban road, hierarchy, traffic management, Intelligent Transport Systems. Legal Issues in Planning and Professional Practice
- CO5 To understand Master Plan, City Development Plan, Structure Plan, housing, land use, Water Supply & sanitation,

Reference Books :

1. Urban Planning: Theory & Practice By M. Pratap Rao
2. Urban Transportation: Planning, Operation and Management by S. Ponnuswamy, D.Johnson Victor
3. Sustainable Urban Planning in India by Joy Sen
4. Urban Planning in India by Amiya Kumar Das



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BCE0754 Elective-IV Life Cycle Costing Of Structures

Course Content

Course Objectives:

1. Develop skills in gathering and managing data related to construction, operation, maintenance, and disposal costs.
2. Understand the implications of risk and uncertainty in life cycle costing, including how to incorporate these factors into cost analyses.
3. Apply LCC principles to real-world case studies and projects, demonstrating the practical relevance of course concepts.

Unit-I

Introduction- Life-Cycle Cost Analysis (Lcca) Method, Costs ,Initial Costs-Purchase, Acquisition, Construction Costs, Fuel Costs, Operation, Maintenance, And Repair Costs, Replacement Costs, Residual Values—Resale Or Salvage Values Or Disposal Costs, Finance Charges—Loan Interest Payments ,Non-Monetary Benefits Or Costs

Unit-II

Parameters For Present- Value Analysis, Discount Rate, Cost Period(S),Discounting Convention, Treatment of Inflation

Unit-III

Life-Cycle Cost Calculation, Supplementary Measures, Evaluation Criteria, Uncertainty Assessment in Life-Cycle Cost Analysis, sensitivity Analysis, Break-Even Analysis

Unit-IV

Design and Analysis Tools, Applications, Relevant Codes and Standards, LCCA Guidelines for OMB Projects,LCCA Guidelines for FEMP Projects

Unit-V

Case Study Case study for application of LCC techniques and use of various software for LCC.

Course Outcome:

- CO1 To understand Life-Cycle Cost Analysis (Lcca) Method, Costs ,Initial Costs-Purchase.
- CO2 To understand about the Value Analysis
- CO3 To understand Cost Calculation, Supplementary Measures, Evaluation Criteria, Uncertainty
- CO4 To Assessment in Life-Cycle Cost Analysis, sensitivity Analysis, Break-Even Analysis.
- CO5 To understand Applications, Relevant Codes and Standards, LCCA Guidelines for OMB Projects, LCCA Guidelines for FEMP Projects.

Reference Books :

1. Life Cycle Costing For Construction by J.W. Bull , Taylor & Francis.
2. A Life Cycle Approach to Buildings By Niklaus Kohler, Holger König, Johannes Kreissig, Thomas Lützkendorf
3. Life-Cycle Cost Analysis of Built Assets by Whyte Andrew



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BCE071P Advance Structural Design–I (RCC) Lab

List of Experiment (Minimum 10 Experiment to be performed)

1. Introduction to latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
2. Modeling of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro. (including Earthquake and Wind Loads)
3. Analysis and Interpretation of Results of Analysis on RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
4. Design and Interpretation of Results of Design of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
5. Modeling, of Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro. (including Earthquake and Wind Loads)
6. Analysis and Interpretation of Results of Analysis on Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
7. Design and Interpretation of Results of Design of Steel Frame on latest version of a Standard Structure Engineering Design Package such as STAAD Pro.
8. Case Study of design of a RCC Multistory Building / Steel Industrial Building on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
9. Introduction to latest version of Finite Element Package such as ANSYS.
10. Modeling of a Steel Angle section on ANSYS and viewing the results.
11. Design of Multistory Building for Dead Loads and Live Loads.
12. Design of Multistory Building for Dead Loads, Live Loads and Wind Loads.
13. Design of Multistory Building for Dead Loads, Live Loads and Earthquake Loads.

List of Equipments / Machine Required:

1. PIV Computers with 17” Colour Monitors & UPS
2. STAAD Pro Software
3. ANSYS Software Recommended

Reference Books:

1. Users Manuals for STAAD Pro Software.
2. Users Manuals for ANSYS Software.



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BCE072P Structural Design–II (STEEL)Lab

List of Experiment

1. Introduction to latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
2. Geometrical Modeling of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
3. Modeling of loads and load combinations on RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
4. Analysis and Interpretation of Results of Analysis of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
5. Design of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
6. Interpretation of Results of Design of RCC Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
7. Geometrical Modeling of Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
8. Modeling of loads and load combinations on Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
9. Analysis and Interpretation of Results of Analysis of Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
10. Design of Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
11. Interpretation of Results of Design of Steel Frame on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
12. Design of R.C.C. Column on latest version of a Standard Structural Engineering Design PackagesuchasSTAAD.etc.
13. Design of R.C.C. Isolated Footing on latest version of a Standard Structural Engineering Design Package such as STAAD.etc.
14. Case Study of design of a RCC Multistory.
15. Building on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.
16. Case Study of design of a Steel Industrial Building on latest version of a Standard Structural Engineering Design Package such as STAAD Pro.

List of Equipments / Machine Required:

1. PIV Computers with 17" Colour Monitors & UPS
2. STAAD Pro Software
3. ANSYS Software Recommended

Reference Books:

1. Users Manuals for STAAD Pro Software.
2. Users Manuals for ANSYS Software.



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BCE073P Advance Construction Technique & Equipment Lab

List of Experiment:

1. To study different types of Non Destructive Test in Civil Engineering.
2. To study electromagnetic methods of testing concrete.
3. To study radiographic testing.
4. To determine strength of concrete by Non Destructive Test using Rebound Hammer.
5. To determine strength of concrete by Non Destructive Test using Ultrasonic Pulse velocity.
6. To determine material content.
7. Carbonation depth measurement test.
8. Permeability test on concrete.
9. Penetration resistance or Windsor probe test on concrete.
10. Resistivity measurement concrete.

Reference Books :

1. Derucher K., Korfiatis G. and Ezeldin S., Materials for Civil and Highway Engineers ", Prentice Hall Inc., 1999. 4th Edition
2. Peurifoy R.L., Ledbetter W. B. and Schexnayder C., Construction Planning, Equipment and Methods ", 5th Edition, McGraw Hill, Singapore, 1995.
3. Chetan Singh Rebound Hammer Test & Non Destructive Test of Concrete



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BCE076 P Project – I LAB

1. **Introduction** : Importance of project work, guide line and general introduction
2. **Selection of Project** : The project can be selected from any four civil engineering system like Building construction system, transportation engineering system, irrigation engineering system. A topic for project can also be selected on recent development in civil engineering.
3. **Planning of project** : Planning of field work, line of action, work distribution, data to be collected by different batches. projects to be undertaken by a group of 4 to 6 students.
4. **The project report shall be in the following format:**
 - Topic and objectives
 - Collection of data, required survey work,
 - Management and construction procedure
 - Resources scheduling and networking
 - Design details
 - Required drawing set
 - Utility to society if any
 - Conclusion

List Of Civil Engineering Projects:

1. Design of Check Dam/Stop Dam.
2. Study of G Dam (Earthen/Gravity)
3. Micro irrigation –Drip/Sprinkler Irrigation.
4. Junction planning for city roads/planning for roads for congested area/parking
5. Studies etc.
6. Rain water harvesting for domestic or public building.
7. Campus development.
8. Interior decoration.
9. Concrete mix design.
10. Solid waste management.
11. Hospital waste disposal.

12. Recycling of resources.
13. Manufacturing of Pre cast concrete products.
14. Prestressed concrete.
15. Planning Estimating and design for residential apartments/commercialcomplex.
16. Planning and design of water treatment plant for given data.
17. Planning and design of water supply scheme for given lay out.
18. Planning and design of sewage treatment plant for given data.
19. Planning and design of sanitary scheme for given layout.
20. Intelligent & green building material.

Term Work: Shall consist of -- Detailed project report in above format. Separate drawingsheets covering details of the project shall also be prepared

To prepare detailed project report as per following format:

1. Cover page
2. Certificates
3. Acknowledgement
4. Contents Abstract Introduction
5. Literature review
6. Problem formulation Project methodology
7. Data collection and calculations
8. Results and discussions



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BCE077 P Industrial Training Lab

Knowledge Gained-

- Products Raw materials
- Types of major equipments /instruments/machines used in industry with theirspecification,
- approximate cost and specific use
- Manufacturing
- production process
- Faults and remedies
- Maintenance
- Safety features
- Planning.

Skills Learned-

- Process parameter setting of various plastics machineries
- Troubleshooting
- Safety precautions
- Incidents/ cases from Experiences

The Students Should Record Classic Cases For Learning For Others, Such As Tricky Problems And Their Solutions

1. Cost reduction cases
2. Quality improvement
3. Improvement Method

Format Of Industrial Training Report

1. Cover page
2. Certificates
3. Acknowledgement
4. Introduction
5. site review
6. machine & methodology
7. Data collection and calculations
8. Results and discussions