

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---------------|
| Title of the Course | Major Project |
| Course Code | CED0804[P] |

Part A

| | | | | | | | | |
|--|---|-----------------|--------------------|---|---|---|---|---|
| Year | 4th | Semester | 8th | Credits | L | T | P | C |
| | | | | | 0 | 0 | 8 | 8 |
| Course Type | Project | | | | | | | |
| Course Category | Projects and Internship | | | | | | | |
| Pre-Requisite/s | Knowledge of Civil engineering and interdisciplinary subjects. | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- To enhance writing skills and knowledge.(BL2-Understand) CO2- To increase their mental ability.(BL3-Apply) CO3- To inculcate the ability to express innovative opinion and thoughts(BL4-Analyze) CO4- To have Dissertation works as skills development in students.(BL5-Evaluate) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗ | | SDG (Goals) | SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|---|--------------|-------|
| 1 | Project/Problem Identification | Project Work | 8 |
| 2 | Project Analysis, Requirement Gathering | Project Work | 8 |
| 3 | Implementation of Project/Solution | Project Work | 8 |
| 4 | Testing and Verification | Project Work | 8 |
| 5 | Presentation and Report Writing | Project Work | 8 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|------------|--|--|---------------|--------|
| Module-I | Identification of a problem and formulation of a topic of project/thesis | PBL | BL3-Apply | 15 hrs |
| Module-III | Dissertation and Viva-voci | PBL | BL5-Evaluate | 20 hrs |

Part D(Marks Distribution)

| Theory | | | | | |
|-------------|-----------------------|---------------------|--------------------------|---------------------|--------------------------|
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| | 50 | | | | |
| Practical | | | | | |
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| 100 | 50 | 40 | 20 | 60 | |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|-----------------------------------|
| Title of the Course | Plastic design of steel structure |
| Course Code | CEE0807[T] |

Part A

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|--|---|--------------------|---|-----------------------|--------|--------|--------|--------|
| Year | 4th | Semester | 8th | Credits | L 3 | T 1 | P 0 | C 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- Learn Introduction and basic hypothesis, Virtual work in the elastic-plastic state(BL2-Understand) CO2- Learn Method of Limit Analysis, applicable to beams basic theorems of limit analysis, rectangular portal frames, gable frames, grids(BL4-Analyze) CO3- Learn Limit design Principles, and method of combining(BL5-Evaluate) CO4- Calculate of Deflection in Plastic beams and frames.(BL5-Evaluate) CO5- Learn Minimum weight Design(BL5-Evaluate) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗ | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|----------|----------|-------|
|---------|----------|----------|-------|

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|--|--|---------------|-------|
| 1 | Prepare at least one drawing in any CAD software (like AutoCAD) for design of structures conducted in the syllabus | PBL | BL4-Analyze | 15 |
| 2 | Preparation of EXCLE Worksheets for the design of various structural components of Plate Girder/ Gantry Girder/ Foot Over bridge | PBL | BL4-Analyze | 15 |

Part D(Marks Distribution)

| Theory | | | | | |
|-------------|-----------------------|---------------------|--------------------------|---------------------|--------------------------|
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| 100 | 40 | 40 | 12 | 60 | 0 |
| Practical | | | | | |
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| | | | | | |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---------------------------------|
| Title of the Course | Building Environment & Services |
| Course Code | CEE0808[T] |

Part A

| Year | 4th | Semester | 8th | Credits | L | T | P | C |
|--|---|----------|--------------------|---|---|---|---|---|
| | | | | | 3 | 1 | 0 | 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | <p>CO1- Students will learn the importance of durability of civil engineering structures (BL2-Understand)</p> <p>CO2- Students will be able to detect the defects in foundation, masonry, plastering, Painting, flooring, doors and windows(BL3-Apply)</p> <p>CO3- Students will be able to provide preventive and remedial measures for Defects(BL4-Analyze)</p> <p>CO4- Students will be able to locate and place different components like Lifts, electrical panels etc.(BL4-Analyze)</p> <p>CO5- Students will learn the importance of Need for retrofitting and restoration (BL2-Understand)</p> | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|---|--|-------|
| 1 | Durability of civil engineering structures: – Importance of durability – Factors affecting durability of buildings – life expectancy of different classes of buildings. Environmental factors that affect the durability of structures – Effect of natural agents (Air, sun, rain, frost and biological agents such as vegetation & insects) – Environmental pollution – Effect of pollution of air, water and soil – Location effect (Marine, Industrial area etc.) – Usage aspects (Structures subjected to dynamical loading & abrasive condition) - Preventive and remedial measures. Role of maintenance in durability and serviceability of buildings: – Necessity of maintenance – Economic aspects of maintenance. Different types of maintenance – Preventive maintenance – Remedial maintenance – Routine maintenance – Pre-monsoon maintenance - Special maintenance – Planning aspects of maintenance | Lectures with Presentation, Video Lectures | 8 |
| 2 | Cracks in buildings – Defects in foundation, masonry, plastering, Painting, flooring, doors and windows, concrete (RCC and PCC) and wooden roof – Corrosion of reinforcement and steel structures – structural damage due to fire - Causes – Preventive and remedial measures Cracks in buildings – Causes - Preventive and remedial measures | Lectures with Presentation, Practical visits to detect cracks and defects in a building | 8 |
| 3 | Causes - Preventive and remedial measures for Defects in foundation, masonry wooden roof concrete (RCC and PCC) Corrosion of reinforcement and steel structures flooring doors and Painting Defects due to fire, Stair case, water supply system, sewage and sullage system, in drainage system and electrical system Building Services Introduction to other building services | Lectures with Presentation, Practical visits to detect cracks and defects in a building | 8 |
| 4 | Lift – Location – RTT – Number of lifts – lift well and shaft – Machine room. Air conditioning system: Types of A/C – Capacity determination – Requirements for an A/C room. Electrical installations: Panel board & Buss bar, rising mains – distribution boards – MCB – ELCB – DP - TP and change over switch switches - Telephone and TV connectivity – Requirements of domestic gas pipeline | Lectures with Presentation, Case Study on different lift locations | 8 |
| 5 | Retrofitting and restoration of building – Need for retrofitting and restoration – Common retrofitting works carried out – Shoring and underpinning – Different methods of retrofitting and restoration – Challenges in retrofitting and restoration works. Deterioration of monumental and historical buildings – Common causes – Preventive measures – Restoration works – Conservation of world heritages | Lectures with Presentation, Practical visits to provide solutions for cracks and defects in a building | 8 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|---|--|---------------|-------|
| 1 | Plan and draw in detail ventilation and air-conditioning for a given building | PBL | BL3-Apply | 15 |
| 2 | Plan movement facilities: Lifts, escalators, ramps etc. for a given public building | PBL | BL3-Apply | 15 |

Part D(Marks Distribution)

| Theory | | | | | |
|-------------|-----------------------|---------------------|--------------------------|---------------------|--------------------------|
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| 100 | 40 | 40 | 12 | 60 | 0 |
| Practical | | | | | |
| Total Marks | Minimum Passing Marks | External Evaluation | Min. External Evaluation | Internal Evaluation | Min. Internal Evaluation |
| | | | | | |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---|
| Title of the Course | Design of Pre stressed Concrete Structure |
| Course Code | CEE0809[T] |

Part A

| | | | | | | | | |
|--|--|-----------------|--------------------|-----------------------|-------------------------------|--------|--------|--------|
| Year | 4th | Semester | 8th | Credits | L 4 | T 1 | P 0 | C 5 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | basic properties of materials, and steel and Rcc design | | | Co-Requisite/s | basic knowledge of structures | | | |
| Course Outcomes & Bloom's Level | CO1- Students will remember the WSM Method for RCC and Pre-stressed Structures.(BL1-Remember) CO2- To understand different types and Methods of Pre-stressing.(BL2-Understand) CO3- Students will be able to apply the knowledge of Pre-stressing on different RCC Structures.(BL3-Apply) CO4- To analyze Beam for different Profiles of Tendons.(BL4-Analyze) CO5- To evaluate the stress distribution for different zones of beams(BL5-Evaluate) CO6- To Create and design a Pre-stressed beam and understand its advantages over RCC(BL6-Create) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗ | | SDG (Goals) | | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|----------|--|--|-------|
| unit 1 | Introduction, Principles of prestressing, Different methods of prestressing – post tensioning and pre-tensioning. Prestressed concrete materials. Need for high strength concrete and High concrete tensile steel. Creep and shrinkage of concrete, relaxation of steel. Losses of prestress friction and anchorage of steel | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| unit II | Introduction , assumption in plastic analysis Safe moment ,yield moment , plastic moment, shape factor, load factor, moment curvature relationship , collapse load for standard cases, plastic hing length | Lectures with problem based learning, experimental learning, case study, field trips | 9 |
| unit III | Stress-pattern in anchorage zones. Transmission length. End zone reinforcement. Stress distribution in end block | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| unit IV | Plastic design of columns for different condition | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| unit V | Design of R.C.C structures concepts (W.S.M) | Lectures with problem based learning, experimental learning, case study, field trips | 9 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|--|--|---------------|-------|
| I | making model of prestressed beam | PBL | BL4-Analyze | 3 |
| II | making a model of prestressed slabs | PBL | BL5-Evaluate | 2 |
| III | making of model of prestressed coloums | PBL | BL4-Analyze | 2 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---------------------|
| Title of the Course | Traffic Engineering |
| Course Code | CEE0810[T] |

Part A

| | | | | | | | |
|--|---|-----------------|--------------------|-----------------------|---|---|---|
| Year | 4th | Semester | 8th | Credits | L | T | P |
| | | | | | 4 | 2 | 0 |
| Course Type | Theory only | | | | | | |
| Course Category | Discipline Electives | | | | | | |
| Pre-Requisite/s | basic knowledge of traffic and highway engineering | | | Co-Requisite/s | | | |
| Course Outcomes & Bloom's Level | CO1- To remember the various concepts in traffic engineering.(BL1-Remember) CO2- To understand & analyze the traffic engineering problems(BL2-Understand) CO3- To implement car-following models, queuing theories, and design of traffic signals in traffic engineering.(BL3-Apply) CO4- To provide experimental basis, and to enable the students to suggest the car-following theory and traffic control measures that will best suit the Indian traffic condition.(BL4-Analyze) CO5- To evaluate the vehicle, highway and traffic factors that influences the movement of vehicles and design of traffic control measures(BL5-Evaluate) | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗ | | SDG (Goals) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|----------|---|--|-------|
| unit 1 | Introduction: Role of traffic Engineer, Vehicle, highway and traffic factors. Traffic characteristics, Vehicular Road users, Introduction to Traffic Noise and Air Pollution and remedial measures. | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| unit II | Traffic flow: Interrupted and Uninterrupted Traffic Flow, Highway capacity: Urban, rural and intersection, Capacity of transit system, Traffic flow theory: Car Following and Queuing Theory. | Lectures with problem based learning, experimental learning, case study, field trips | 9 |
| unit III | Traffic Studies: Traffic volume studies, speeds studies, Speed and Delay Studies, Origin and Destination studies, Accident studies, capacity studies, parking studies. | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| unit IV | Traffic Control: regulations and other operational controls, Traffic Signal and marking, street lighting, Traffic Safety: Barricades, delineators. | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| unit V | Design of Intersections: Channelizing islands, Design of Rotaries, Intersection and terminal Design, Parking facilities. | Lectures with problem based learning, experimental learning, case study, field trips | 9 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|-----------------------------|--|----------------|-------|
| I | model of traffic light | PBL | BL2-Understand | 3 |
| II | drawing of pavement marking | Experiments | BL4-Analyze | 2 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|-------------------------------------|
| Title of the Course | Energy Efficient and Green Building |
| Course Code | CEE0811[T] |

Part A

| Year | 4th | Semester | 8th | Credits | L | T | P | C |
|--|---|----------|--------------------|---|---|---|---|---|
| | | | | | | | | |
| | | | | | 3 | 1 | 0 | 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- Understand the concept of Green Buildings(BL2-Understand) CO2- Analyze & compute the energy flow in buildings(BL4-Analyze) CO3- Understand the energy efficient buildings(BL2-Understand) CO4- Design the building as per LEED India Rating System(BL4-Analyze) CO5- Design an Eco-friendly captive power generation(BL5-Evaluate) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|--|---|-------|
| 1 | What is Green Building, Why to go for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, What are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building | Lectures with Presentation and Seminar | 8 |
| 2 | Indian Green Building Council, Green Building Moment in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency | Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures | 8 |
| 3 | Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximise System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks, Use of Renewable Energy Sources, Ecofriendly captive power generation for factory, Building requirement | Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures | 8 |
| 4 | Introduction, CII Godrej Green business centre, Design philosophy, Design interventions, Energy modeling, HVAC System design, Chiller selection, pump selection, Selection of cooling towers, Selection of air handling units, Precooling of fresh air, Interior lighting system, Key feature of the building, Eco-friendly captive power generation for factory, Building requirement | Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures | 8 |
| 5 | Handling of non process waste, waste reduction during construction, materials with recycled content, local materials, material reuse, certified wood, Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indoor air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels | Lectures with Microsoft Presentation, Poster Presentations and Interactive Video Lectures | 8 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---------------------|
| Title of the Course | Airport Engineering |
| Course Code | CEE0812[T] |

Part A

| | | | | | | | | |
|--|---|-----------------|--------------------|---|--------|--------|--------|--------|
| Year | 4th | Semester | 8th | Credits | L 3 | T 1 | P 0 | C 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- Describe the different components of airport and aircrafts(BL2-Understand) CO2- Analyse the requirements of an airport layout with respect to international regulations(BL4-Analyze) CO3- Explain the airport runway design(BL4-Analyze) CO4- Design Taxiways & Aprons.(BL3-Apply) CO5- Summarise the concepts of the terminal service facilities(BL3-Apply) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|---|---|-------|
| 1 | AIR TRANSPORTATION Airport terminology, component parts of Aeroplane, Classification and size of airports; Aircraft characteristics. Air traffic control need for ATC, Air traffic control network, Air traffic control aids –enroute aids, landing aids. Airport site location and necessary surveys for site section, airport obstructions. | Lectures with Presentation, Site Visit to Airport | 8 |
| 2 | PLANNING: Airport master plan –FAA recommendations, Regional Planning, ICAO recommendations, Estimation of future airport traffic needs-layout of Air Port | Lectures with Presentation, Site Visit to Airport | 8 |
| 3 | RUNWAYS: Runway orientation – windrose diagram, basic runway length, corrections for elevation, temperature and gradient, runway geometric design, runway pavement design introduction | Lectures with Presentation, Site Visit to Airport | 8 |
| 4 | TAXIWAYS AND APRONS: Loading aprons –holding aprons – Geometric design standards, exit taxiways –optimal location, design, and fillet and separation clearance | Lectures with Presentation, Site Visit to Airport | 8 |
| 5 | OTHER FACILITIES: Lighting, visual airport marking, airport lighting aids. OPERATIONS AND SCHEDULING: Ground transportation facilities; Airport capacity, runway capacity and delays. | Lectures with Presentation, Site Visit to Airport | 8 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|--|--|---------------|-------|
| 1 | Project On Airport Planning and Design | PBL | BL3-Apply | 15 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|------------------------|
| Title of the Course | Solid Waste Management |
| Course Code | CEE0813[T] |

Part A

| Year | 4th | Semester | 8th | Credits | L | T | P | C |
|--|--|----------|--------------------|---|-----------------------|---|---|---|
| | | | | | 3 | 1 | 0 | 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | | Co-Requisite/s | | | |
| Course Outcomes & Bloom's Level | CO1- Students will Understand the concept of solid waste management(BL2-Understand) CO2- Students will be able to explain handling and processing of solid waste(BL2-Understand) CO3- Students will be able to apply the concept of landfilling for disposal of solid waste(BL3-Apply) CO4- Students will be able to design composting and other solid waste conversion units(BL4-Analyze) CO5- Students will understand the various hazardous waste, risk assessment and legislation (BL2-Understand) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | | SDG (Goals) | SDG6(Clean water and sanitation) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|--|--|-------|
| 1 | Solid waste: Public health and ecological impacts, Sources and types of solid wastes, material flow and waste generation, Functional elements: Waste generation, storage, collection, Transfer and transport, processing and recovery, disposal. Physical and chemical composition of municipal solid waste, integrated solid waste management, hierarchy of waste management options, different methods for generation rates. Storage: movable bins, fixed bins. Collection: home to home collection, community bin system, Theory and design of hauled container system, stationary container system | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 2 | Transportation: handcart, tri-cycle, animal cart, tripper truck, dumper placer, bulk refuse carrier, railroad transport, water transport, conveyors, layout of routes. Engineering system for on-site handling and processing of solid waste: separators, size reduction equipments, screening equipments, densification, baling, cubing, pelleting equipments | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 3 | Land filling: Site selection criteria, landfill layout, landfill sections, Occurrence of gases and leachate in landfills: composition and characteristics, generation factors, initial adjustment phase, transition phase, acid formation phase, methane formation phase, maturation phase of gases and leachate, Introduction to engineered landfills | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 4 | Composting, types of composting, process description, design and operational consideration of aerobic composting, process description, design and operational consideration of anaerobic composting. Thermal conversion technologies: incineration and pyrolysis system, energy recovery, system. Overview of solid waste management practices in India | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 5 | Introduction to Hazardous wastes, Definition of Hazardous waste, The magnitude of the problem; Hazardous waste: Risk assessment, Environmental legislation, Characterization and site assessment, Waste minimization and resource recovery, Transportation of hazardous waste, Disposal of hazardous waste. Introduction to Electronic waste and Biomedical waste and their disposal | Lectures with problem based learning, experimental learning, case study, field trips | 8 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|-------------------------------|
| Title of the Course | Urban Transportation Planning |
| Course Code | CEE0814[T] |

Part A

| | | | | | | | | |
|--|---|--------------------|--|-----------------------|--------|--------|--------|--------|
| Year | 4th | Semester | 8th | Credits | L 3 | T 1 | P 0 | C 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Electives | | | | | | | |
| Pre-Requisite/s | | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- Students will be able to Understand the basic concepts of planning at urban and regional levels(BL2-Understand) CO2- Students will be able to Distinguish between the Conventional and current approaches for travel demand estimation(BL4-Analyze) CO3- Students will be able to Implement various types of models and trip generation(BL3-Apply) CO4- Students will be able to Analyze the urban travel markets(BL4-Analyze) CO5- Students will be able to Evaluate the transport planning proposals(BL5-Evaluate) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | SDG (Goals) | SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) | | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|--|--|-------|
| 1 | Introduction to transportation planning, planning concept, Goals, objectives, and Importance of transportation planning. Nature of traffic problems in cities. Present Scenario of road transport and rail transport assets. Role of transportation: Social, Political, Environmental. Transport and Socioeconomic Activities, Historical Development of Transport, Transportation in the Cities, Freight Transportation, Future Developments. | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 2 | Urban form and Transport patterns, land use – transport cycle, concept of accessibility. Types of transport systems, evolution of transport modes, transport problems and mobility issues. Public Transport: Intermediate Public Transport (IPT) Rapid and mass transport system like MRTS & bus rapid transit. Transport Planning Process, Problem Definition, Solution Generation | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 3 | Travel demand: Estimation and forecasting, trip classification, trip generation: factor and methods, multiple regression analysis. Trip distribution methods, modal split, trip assignment | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 4 | Studying travel behavior. Analyzing urban travel markets. Traffic and transportation surveys and studies, traffic and travel characteristics, urban transport planning process – stages, study area, zoning, database | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 5 | Evaluation of transport planning proposals: Land Use Transport Planning, Economic Evaluation methods like Net present Value methods, and Benefit Cost method. Transport system management: Long-term and short-term planning | Lectures with problem based learning, experimental learning, case study, field trips | 8 |

Part C

| Modules | Title | Indicative-ABCA/PBL/ Experiments/Field work/ Internships | Bloom's Level | Hours |
|---------|-------------------------------------|--|---------------|-------|
| 1 | Traffic Survey of National Highways | PBL | BL4-Analyze | 15 |
| 2 | Parking Planning for given vehicles | PBL | BL4-Analyze | 15 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|--------------------------------|
| Title of the Course | Design of Hydraulic Structures |
| Course Code | CEL0827[T] |

Part A

| Year | 4th | Semester | 8th | Credits | L | T | P | C |
|--|---|----------|--------------------|---|---|---|---|---|
| | | | | | 3 | 1 | 2 | 6 |
| Course Type | Embedded theory and lab | | | | | | | |
| Course Category | Discipline Core | | | | | | | |
| Pre-Requisite/s | Basics of Structural Design and Analysis | | | Co-Requisite/s | | | | |
| Course Outcomes & Bloom's Level | CO1- To remember the various concepts in theory of Dams(BL1-Remember) CO2- To understand & analyze the different Hydraulic structures(BL2-Understand) CO3- To implement the different designing concepts of Spillways(BL3-Apply) CO4- To provide experimental basis, and to enable the students to analyze the design of gravity dams(BL4-Analyze) CO5- To evaluate the applications of different Energy dissipators in various fields such as research & industries(BL5-Evaluate) CO6- To apply the understanding of Hydel power plant in solving problem of electricity(BL3-Apply) | | | | | | | |
| Courses Elements | Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗ | | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|--|--|-------|
| 1 | Gravity dams: Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practical profile, foundation treatment, construction joints, galleries in gravity dams. | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 2 | Earth and Rock fill dams : Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition. Rock fill dams: Types, merits and demerits, conditions favourable for their adoption. | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| 3 | Spillways : Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways, emergency spillways. | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 4 | Energy dissipators and gates : Principles of energy dissipation Energy dissipators based on tail water rating curve and jump height curves Spillway crest gates - vertical lift and radial gates, their design principles and details. Design of canal regulating structures, Detailed design of Sarda Falls, design of cross drainage works, sphyon aquaduct | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| 5 | Hydropower Plants: Introduction of Hydropower development, assessment of power potential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details. | Lectures with problem based learning, experimental learning, case study, field trips | 8 |

Syllabus-2023-2024

(SOET)(BTech-CivilEngineering)

| | |
|----------------------------|---|
| Title of the Course | Retrofitting and rehabilitation of structures |
| Course Code | CEL0831[T] |

Part A

| | | | | | | | | |
|--|---|-----------------|--------------------|---|-----------------------|---|---|---|
| Year | 4th | Semester | 8th | Credits | L | T | P | C |
| | | | | | 3 | 1 | 0 | 4 |
| Course Type | Theory only | | | | | | | |
| Course Category | Discipline Core | | | | | | | |
| Pre-Requisite/s | | | | | Co-Requisite/s | | | |
| Course Outcomes & Bloom's Level | CO1- Students will be able to learn various distress and damages to concrete and masonry structures(BL1-Remember) CO2- To understand the importance of maintenance of structures(BL2-Understand) CO3- To study the various types and properties of repair materials(BL2-Understand) CO4- To assess the damage to structures using various tests (BL4-Analyze) CO5- To learn the importance and methods of substrate preparation CO6- To learn various repair techniques of damaged structures, corroded structures | | | | | | | |
| Course Elements | Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✓ | | SDG (Goals) | SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies) | | | | |

Part B

| Modules | Contents | Pedagogy | Hours |
|---------|---|--|-------|
| 1 | Introduction Maintenance, rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures. Cracks in R.C. buildings Various cracks in R.C. buildings, causes and effects Maintenance importance of maintenance, routine and preventive maintenance. Damages to masonry structures Various damages to masonry structures and causes | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| 2 | Repair materials Various repair materials, Criteria for material selection, Methodology of selection, Health and safety precautions for handling and applications of repair materials Special mortars and concretes Polymer Concrete and Mortar, Quick setting compounds Grouting materials Gas forming grouts, Salfalumate grouts, Polymer grouts, Acrylate and Urethane grouts. Bonding agents Latex emulsions, Epoxy bonding agents. Protective coatings Protective coatings for Concrete and Steel FRP sheets | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| 3 | Damage diagnosis and assessment Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test, Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement Substrate preparation Importance of substrate/surface preparation, General surface preparation methods and procedure, Reinforcing steel cleaning | Lectures with problem based learning, experimental learning, case study, field trips | 10 |
| 4 | Crack repair Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks. Corrosion of embedded steel in concrete Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair of various corrosion damaged of structural elements (slab, beam and columns) | Lectures with problem based learning, experimental learning, case study, field trips | 8 |
| 5 | Jacketing Jacketing, Column jacketing, Beam jacketing, Beam Column joint jacketing, Reinforced concrete jacketing, Steel jacketing, FRP jacketing. Strengthening Strengthening, Beam shear strengthening, Flexural strengthening | Lectures with problem based learning, experimental learning, case study, field trips | 8 |

