

Syllabus for ISE II (B. Tech Civil Engineering (AY 2019-20))

Sr. No	Course code	Name of course	Syllabus for ISE II
1	CE451	Water Resources Engineering-II	<p>Gravity Dams: Introduction, cross section, forces acting on dam, load combinations as specified by IS 6512-1984, stresses in dam (normal, principal and shear stresses), modes of failures, stability analysis and design of gravity dam, elementary and practical profile, low and high dam, materials of construction, control of cracking, galleries, Joints and keys.</p> <p>Earth Dams : Introduction, types, elements of earth dam, basic design considerations, causes of failures, piping and its prevention</p>
2	CE452	Transportation Engineering	<p>Highway Alignment and Geometric Design: Traffic characteristics, operations, design of intersections, design of parking facility, highway lighting, traffic planning and administration.</p> <p>Road Materials: Aggregates and their types, physical and engineering properties, fillers, bitumen, characteristics, emulsions and cutbacks, basic tests on all materials, soil investigation, test on soil; CBR, plate load test for modulus of subgrade reaction.</p> <p>Construction of Roads: Stabilized earth, gravel roads, W.B.M. roads, high cost roads, bituminous roads, cement concrete roads</p>
3	CE453	(Elective-II) Advanced Design of Steel Structures	<p>Microwave Towers: Introduction, structural configuration, function, analysis and design.</p> <p>Tubular Structures: Design of tubular Trusses.</p>
4	CE454	(Elective-III) Railway Tunnel and Airport Engineering	<p>Points and crossings: Important terms, types of track layouts and sketches of turn out, diamond crossing, triangle, double junction, scissors cross over, single slip, double slip, gathering line, signalling and interlocking: objectives of signalling, classification of signals, CTC and ATC system, interlocking & its principles.</p> <p>Railway Stations and yards: Classification of railway stations, Purpose, facilities required at railway stations, requirements of station yard, types of yards,</p> <p>Tunnels: Necessity, types, advantages and disadvantages of tunnels compared to open cuts, tunnel alignment, size and shape of tunnels, tunnel lining, drainage, ventilation & lighting of tunnels, tunneling methods for soft ground.</p>

Syllabus for Self Study (B. Tech Civil Engineering (AY 2019-20))

Sr. No	Course code	Name of course	Syllabus for Self Study
1	CE451	Water Resources Engineering-II	Canal Irrigation: Types of irrigation canals, canal alignment. Design of cross section of stable unlined channels in alluvial soil by Kennedy's and Lacey's theories according to IS 7112 – 1973, merits and demerits of Kennedy's and Lacey's theories, Garret's diagram. Design procedure for L – section of an irrigation canal, balancing depth, losses in canals, schedule of area statistics and channel dimensions.
2	CE452	Transportation Engineering	Bridges: Site investigation, waterway calculations, scours depth, afflux, and economic span. Classification of superstructures with respect to structural behaviour and material used types of substructures, flooring joints, movable bridges, and temporary bridges. Methods of erection of various types of bridges, testing and strengthening of bridges Bridge Bearings & Foundation: Suitability for each type of bridges, IRC 37-2001, IRC58-2002,
3	CE453 (A)	(Elective-II) Advanced Design of Steel Structures	Transmission Towers: Introduction, structural configuration, bracing systems, analysis and design as per codal provisions. Use working stress method.
4	CE454 (D)	(Elective-III) Railway Tunnel and Airport Engineering	Airport: Agencies controlling national and international aviation, various surveys to be conducted, airport, classifications (ICAO), selection of site for airport Airport obstructions: Zoning laws, imaginary surfaces, approach and turning zone. Runway and Taxiway Design: Orientation of runway, wind rose diagram, basic runway length and corrections, runway geometric design standards, drainage, introduction to pavement design airport layout, terminal area, unit terminal concept, apron, apron layout, aircraft parking, hangers, environmental guidelines for airport projects, heliports, main characteristics of helicopters, nature of helicopters transport, site selection for helicopters.

Syllabus for ESE (B. Tech Civil Engineering (AY 2019-20))

Sr. No	Course code	Name of course	Syllabus for ESE
1	CE451	Water Resources Engineering-II	<p>Dams: Introduction and scope of the subject, types of dams, reservoir storage zones, selection of site for dam, choice of a dam.</p> <p>Diversion Head Works : Introduction, selection of site, layout of diversion headwork and its components and functions, types of weirs and barrages, causes of failures of weirs on permeable foundations and remedies, hydraulic design of weir with respect to subsurface flow, safety against piping and uplift, Bligh's, Lane's and Khosla's theories.</p> <p>Gravity Dams: Introduction, cross section, forces acting on dam, load combinations as specified by IS 6512-1984, stresses in dam (normal, principal and shear stresses), modes of failures, stability analysis and design of gravity dam, elementary and practical profile, low and high dam, materials of construction, control of cracking, galleries, Joints and keys.</p> <p>Earth Dams : Introduction, types, elements of earth dam, basic design considerations, causes of failures, piping and its prevention,</p> <p>Canal Irrigation: Types of irrigation canals, canal alignment. Design of cross section of stable unlined channels in alluvial soil by Kennedy's and Lacey's theories according to IS 7112 – 1973, merits and demerits of Kennedy's and Lacey's theories, Garret's diagram. Design procedure for L – section of an irrigation canal, balancing depth, losses in canals, schedule of area statistics and channel dimensions.</p>
2	CE452	Transportation Engineering	<p>Highway Planning and Development: Highway planning in India, development, rural and urban roads, road, departments in India, road classification, road authorities i.e. IRC, CRRI, NHAI, PMGSY Program etc. Financing of road projects, road safety audit</p> <p>Field Surveys: Reconnaissance, aerial surveys, location surveys, location of bridges</p> <p>Highway Alignment and Geometric Design: highway alignment, cross section, formation width, land width, design of vertical and horizontal alignment including curves, super elevation, sight distance, gradients, alignment and geometrics of hill roads. Traffic characteristics, operations, design of intersections, design of parking facility, highway lighting, traffic planning and administration</p> <p>Road Materials: Aggregates and their types, physical and engineering properties, fillers, bitumen, characteristics, emulsions and cutbacks, basic tests on all materials, soil investigation, test on soil; CBR, plate load test for modulus of subgrade reaction</p> <p>Construction of Roads: Stabilized earth, gravel roads, W.B.M. roads, high cost roads, bituminous roads, cement concrete roads.</p> <p>Bridges: Site investigation, waterway calculations, scours depth, afflux, and economic span. Classification of superstructures with respect to structural behaviour and material used types of substructures, flooring joints, movable bridges, and temporary bridges. Methods of erection of various types of bridges, testing and strengthening of bridges</p> <p>Bridge Bearings & Foundation: Suitability for each type of bridges IRC 37-2001, IRC58-2002,</p>

3	CE453	(Elective-II) Advanced Design of Steel Structures	<p>Hoarding Structures : Analysis and design of hoarding structures under dead, live and wind load conditions as per codal provisions by limit state method, introduction to fatigue failure. introduction to gantry girder.</p> <p>Microwave Towers: Introduction, structural configuration, function, analysis and design.</p> <p>Transmission Towers: Introduction, structural configuration, bracing systems, analysis and design as per codal provisions. Use working stress method.</p> <p>Tubular Structures: Design of tubular Trusses.</p>
4	CE454	(Elective-III) Railway Tunnel and Airport Engineering	<p>Railway: Characteristics of railway transport, classification of railway, track standard terminology, track sections in embankment and cutting, engineering survey.</p> <p>Railway Track Gauge: Different gauges on indian railways, loading gauge, construction gauge, unigauge, problems caused by change of gauge.</p> <p>Track and Track stresses: Requirements, forces acting on track, coning of wheels, tilting of rails, rails: functions, types of rails, rail joints, rail failure, function suitability and drainage, treatment, defects, standard rail sections.</p> <p>Sleeper: Functions, requirements, types of sleepers; concrete sleepers, pre stressed, sleeper density, manufacturing and spacing of sleepers, ballast: function, specifications of track ballast, track fittings: fittings and fastening.</p> <p>Alignment of Railway lines: Importance, basic requirements of an ideal alignment, selection of a good alignment, geometric design of track: necessity for geometric design, gradients, grade compensation on curves, super elevation, equilibrium cant, cant deficiency, maximum permissible Speed, negative super elevation.</p> <p>Resistance to Traction: Resistance to-friction, wave action, causes of creep, effects of creep, measures to reduce creep. speed, track irregularity, wind, gradient, curvature. stress in rails, sleepers, ballast and formation.</p> <p>Construction and Track maintenance: Plate laying method, operations involved Tools & common items of track maintenance.</p> <p>Points and crossings: Important terms, types of track layouts and sketches of turn out, diamond crossing, triangle, double junction, scissors cross over, single slip, double slip, gathering line, signalling and interlocking: objectives of signalling, classification of signals, CTC and ATC system, interlocking & it's principles.</p> <p>Railway Stations and yards: Classification of railway stations, Purpose, facilities required at railway stations, requirements of station yard, types of yards,</p> <p>Tunnels: Necessity, types, advantages and disadvantages of tunnels compared to open cuts, tunnel alignment, size and shape of tunnels, tunnel lining, drainage, ventilation & lighting of tunnels, tunneling methods for soft ground.</p> <p>Airport: Agencies controlling national and international aviation, various surveys to be conducted, airport, classifications (ICAO), selection of site for airport Airport obstructions: Zoning laws, imaginary surfaces, approach and turning zone.</p> <p>Runway and Taxiway Design: Orientation of runway, wind rose diagram, basic runway length and corrections, runway geometric design standards, drainage, introduction to pavement design airport layout, terminal area, unit terminal concept, apron, apron layout, aircraft parking, hangers, environmental guidelines for airport projects, heliports, main characteristics of helicopters, nature of helicopters transport, site selection for helicopters</p>