

LESSON PLAN WATER SUPPLY AND WASTE WATER ENGINEERING (Th.4)

Discipline: CIVIL ENGINEERING	Semester: 5th	Name of the Teaching faculty:
Subject: WATER SUPPLY AND WASTE WATER ENGINEERING	No. of Days/Per Week class allotted:5	Semester From date: _____ To Date: _____ No. of Weeks:
Week	Class Day	Theory/Practical Topics
		SECTION A: WATER SUPPLY
		1.Introduction to Water Supply, Quantity and Quality of water
1st	1st	Necessity of treated water supply
	2nd	Per capita demand, variation in demand and factors affecting demand
	3rd	Per capita demand, variation in demand and factors affecting demand
	4th	Methods of forecasting population, Numerical problems using different methods
	5th	Methods of forecasting population, Numerical problems using different methods
2nd	1st	Methods of forecasting population, Numerical problems using different methods
	2nd	Impurities in water – organic and inorganic, Harmful effects of impurities
	3rd	Analysis of water –physical, chemical and bacteriological
	4th	Analysis of water –physical, chemical and bacteriological
	5th	Water quality standards for different uses
		2.Sources and Conveyance of water
3rd	1st	Surface sources – Lake, stream, river and impounded reservoir
	2nd	Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3rd	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	4th	Yield from well- method s of determination, Numerical problems using yield formulae (deduction excluded)
	5th	Intakes – types, description of river intake, reservoir intake, canal intake
4th	1st	Pumps for conveyance & distribution – types, selection, installation
	2nd	Pipe materials – necessity, suitability, merits & demerits of each type
	3rd	Pipe joints – necessity, types of joints, suitability, methods of jointing Laying of pipes – method
		3.Treatment of water
	4th	Flow diagram of conventional water treatment system
	5th	Treatment process / units :Aeration ; Necessity
5th	1st	Plain Sedimentation : Necessity
	2nd	working principles, Sedimentation tanks – types, essential features, operation & maintenance
	3rd	Sedimentation with coagulation: Necessity, principles of coagulation
	4th	types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)

	5th	Filtration : Necessity, principles, types of filters
6th	1st	Slow Sand Filter, Rapid Sand Filter and Pressure Filter – essential features
	2nd	Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination
	3rd	Disinfection : Necessity, methods of disinfection Chlorination – break point chlorination, super chlorination
	4th	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
	5th	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
		4.Distribution system And Appurtenance in distribution system:
7th	1st	General requirements, types of distribution system-gravity, direct and combined
	2nd	General requirements, types of distribution system-gravity, direct and combined
	3rd	Methods of supply – intermittent and continuous
	4th	Methods of supply – intermittent and continuous
	5th	Distribution system layout – types, comparison, suitability
8th	1st	Distribution system layout – types, comparison, suitability
	2nd	Valves-types, features, uses, purpose-slucice valves, check valves, air valves,scour valves, Fire hydrants, Water meters
	3rd	Valves-types, features, uses, purpose-slucice valves, check valves, air valves,scour valves, Fire hydrants, Water meters
		5.W/s plumbing in building :
	4th	Method of connection from water mains to building supply
	5th	General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code
		SECTION B: WASTE WATER ENGINEERING
		6.Introduction
9th	1st	Aims and objectives of sanitary engineering
	2nd	Definition of terms related to sanitary engineering
	3rd	Systems of collection of wastes– Conservancy and Water Carriage System – features
	4th	Systems of collection of wastes– Conservancy and Water Carriage System – comparison
	5th	Systems of collection of wastes– Conservancy and Water Carriage System –suitability
		7.Quantity and Quality of sewage
10th	1st	Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow,
	2nd	numerical problem on computation quantity of sanitary sewage
	3rd	Computation of size of sewer, application of Chazy's formula,
	4th	Limiting velocities of flow : self-cleaning and scouring
	5th	General importance, strength of sewage, Characteristics of sewage-physical,chemical & biological
11th	1st	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD,COD
	2nd	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD,COD
		8.Sewerage system

	3rd	Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	4th	Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	5th	Shapes of sewer – rectangular, circular, avoid-features, suitability
12th	1st	Shapes of sewer – rectangular, circular, avoid-features, suitability
	2nd	Laying of sewer-setting out sewer alignment
		9.Sewer appurtenances and Sewage Disposal:
	3rd	Manholes and Lamp holes – types, features, location, function
	4th	Inlets, Grease & oil trap – features, location, function
	5th	Storm regulator, inverted siphon – features, location, function
13th	1st	Disposal on land – sewage farming, sewage application and dosing
	2nd	sewage sickness-causes and remedies
	3rd	Disposal by dilution – standards for disposal in different types of water bodies
	4th	self purification of stream
		10.Sewage treatment :
	5th	Principles of treatment
14th	1st	flow diagram of conventional treatment
	2nd	Primary treatment – necessity, principles, essential features, functions
	3rd	Primary treatment – necessity, principles, essential features, functions
	4th	Primary treatment – necessity, principles, essential features, functions
	5th	Secondary treatment – necessity, principles, essential features, functions
15th	1st	Secondary treatment – necessity, principles, essential features, functions
	2nd	Secondary treatment – necessity, principles, essential features, functions
		11.Sanitary plumbing for building :
	3rd	Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	4th	Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	5th	Sanitary fixtures – features, function, and maintenance and fixing of the fixtures – water closets, flushing cisterns, urinals, inspection chambers, traps, anti syphonage pipe

LESSON PLAN FOR ESTIMATING AND COST EVALUATION 2 (TH-05) 2022-23

Discipline: Civil Engineering	Semester: 5th	Name of the Teaching Faculty:
Subject: ESTIMATING AND COST EVALUATION 2 (TH-05)	No. of days/ per week class allotted: 4	No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1ST		CHAPTER-1 Detailed estimate of culverts and bridges
	1	Detailed estimate of a simple Hume pipe culvert with right angled wing walls
	2	Detailed estimate of a simple Hume pipe culvert with right angled wing walls
	3	Detailed estimate of a simple Hume pipe culvert with right angled wing walls
	4	Detailed estimate of a simple Hume pipe culvert with right angled wing walls
2ND	1	Detailed estimate of a simple Hume pipe culvert with right angled wing walls
	2	RCC deck slab culvert with right angled wing wall
	3	RCC deck slab culvert with right angled wing wall
	4	RCC deck slab culvert with right angled wing wall
3RD	1	RCC deck slab culvert with right angled wing wall
	2	RCC deck slab culvert with right angled wing wall
	3	RCC deck slab culvert with right angled wing wall
	4	RCC deck slab culvert with splayed wing wall
4TH	1	RCC deck slab culvert with splayed wing wall
	2	RCC deck slab culvert with splayed wing wall
	3	RCC deck slab culvert with splayed wing wall
	4	RCC deck slab culvert with splayed wing wall
5TH	1	Quantity of steel for deck slab with bar bending schedule of the above jobs
	2	Quantity of steel for deck slab with bar bending schedule of the above jobs
	3	Quantity of steel for deck slab with bar bending schedule of the above jobs
	4	Quantity of steel for deck slab with bar bending schedule of the above jobs
		CHAPTER-2 Estimate of irrigation structures
6TH	1	Detailed estimate of simple type of vertical fall to given specification
	2	Detailed estimate of simple type of vertical fall to given specification
	3	Detailed estimate of simple type of vertical fall to given specification
	4	Detailed estimate of simple type of vertical fall to given specification
7TH	1	Detailed estimate of simple type of vertical fall to given specification
	2	Detailed estimate of simple type of vertical fall to given specification
	3	Detailed estimate of simple type of vertical fall to given specification
	4	Detailed estimate of simple type of vertical fall to given specification
8TH	1	Detailed estimate of simple type of vertical fall to given specification
	2	Detailed estimate of simple type of vertical fall to given specification
	3	Detailed estimate of simple type of vertical fall to given specification
	4	Detailed estimate of simple type of vertical fall to given specification
9TH	1	Detailed estimate of siphon well drop to given specification.
	2	Detailed estimate of siphon well drop to given specification.
	3	Detailed estimate of siphon well drop to given specification.
	4	Detailed estimate of siphon well drop to given specification.
10TH	1	Detailed estimate of siphon well drop to given specification.
	2	Detailed estimate of siphon well drop to given specification.

	3	Detailed estimate of siphon well drop to given specification.
	4	Detailed estimate of siphon well drop to given specification.
11TH	1	Detailed estimate of siphon well drop to given specification.
	2	Detailed estimate of siphon well drop to given specification.
	3	Detailed estimate of siphon well drop to given specification.
	4	Detailed estimate of siphon well drop to given specification.
		CHAPTER-3 Detailed estimate of roads
12TH	1	Detail estimate of a water bound macadam road
	2	Detail estimate of a water bound macadam road
	3	Detail estimate of a water bound macadam road
	4	Detail estimate of a water bound macadam road
13TH	1	Detail estimate of a water bound macadam road
	2	Detailed estimate of a National Highway in cutting / filling
	3	Detailed estimate of a National Highway in cutting / filling
	4	Detailed estimate of a National Highway in cutting / filling
14TH	1	Detailed estimate of a National Highway in cutting / filling
	2	Detailed estimate of a National Highway in cutting / filling
		CHAPTER-4 PWD accounts works
	3	(Works) Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair
	4	Method of execution of works through the contractors, departmentally, contract and agreement, work order, item rate contract, lump sum contract, labour contract and daily labour, piece work agreement, scheduled contract, cost plus percentage contract
15TH	1	(Accounts of works) Explanation of various terms Administrative approval, technical sanction, contingency budget, tender, preparation of notice inviting tender, receiving of quotations, earnest money, security deposit, advance payment, on account payment, intermediate payment, final payment, running bill, final, regular and temporary establishment, cash, major & subhead of account, temporary advance, issue rate, storage, supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts .
	2	Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity Master roll : Its preparation & use for making payment of pay & wages
	3	Acquittance Roll : Its preparation & use for making payment of pay & wages Labour & labour report, method of labour payment, use of forms and necessity of submission
	4	Classification of stores, receipt / issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks, shortage and excess

LESSON PLAN: TH-2.RAILWAY & BRIDGE ENGINEERING

Discipline: Civil Engineering	Semester: 5TH	Name of the Teaching Faculty:
Subject: RAILWAY & BRIDGE ENGINEERING	No. of days/ per week class allotted: 5	No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		Section – A: RAILWAYS
1st	1st	1.0 Introduction : 1.1Railway terminology 1.2Advantages of railways
	2nd	1.3Classification of Indian Railways
	3rd	2.0 Permanent way 2.1 Definition and components of a permanent way
	4th	2.0 Permanent way 2.1 Definition and components of a permanent way
2nd	1st	2.0 Permanent way 2.1 Definition and components of a permanent way
	2nd	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions
	3rd	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions
	4th	2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions
3rd	1st	3.0 Track materials 3.1 Rails 3.1.1 Functions and requirement of rails 3.1.2 Types of rail sections, length of rails
	2nd	3.1.3 Rail joints – types, requirement of an ideal joint 3.1.4 Purpose of welding of rails & its advantages 3.1.5 Creep definition, cause & prevention
	3rd	3.2 Sleepers 3.2.1 Definition, function & requirements of sleepers
	4th	3.2.2 Classification of sleepers 3.2.3 Advantages & disadvantages of different types of sleepers
4th	1st	3.3 Ballast 3.3.1 Functions & requirements of ballast 3.3.2 Materials for ballast
	2nd	3.4 Fixtures for Broad gauge 3.4.1 Connection of rails to rail-fishplate, fish bolts 3.4.2 Connection of rails to sleepers
	3rd	4.0 Geometric for Broad gauge 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment

	4th	4.0 Geometric for Broad gauge 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment
5th	1st	4.0 Geometric for Broad gauge 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment
	2nd	4.2 Permanent & temporary land width
	3rd	4.2 Permanent & temporary land width
	4th	4.3 Gradients for drainage
6th	1st	4.3 Gradients for drainage
	2nd	4.4 Super elevation – necessity & limiting valued
	3rd	4.4 Super elevation – necessity & limiting valued
	4th	4.4 Super elevation – necessity & limiting valued
7th	1st	5.0 Points and crossings 5.1 Definition, necessity of Points and crossings
	2nd	5.0 Points and crossings 5.1 Definition, necessity of Points and crossings
	3rd	5.0 Points and crossings 5.1 Definition, necessity of Points and crossings
	4th	5.2 Types of points & crossings with tie diagrams
8th	1st	5.2 Types of points & crossings with tie diagrams
	2nd	5.2 Types of points & crossings with tie diagrams
	3rd	6.0 Laying & maintenance of track 6.1 Methods of Laying & maintenance of track
	4th	6.0 Laying & maintenance of track 6.1 Methods of Laying & maintenance of track
9th	1st	6.0 Laying & maintenance of track 6.1 Methods of Laying & maintenance of track
	2nd	6.2 Details of a permanent way inspector
	3rd	6.2 Details of a permanent way inspector
	4th	6.2 Details of a permanent way inspector
		Section – B: BRIDGES
10th	1st	7.0 Introductions 7.1 Definitions 7.2 Components of a bridge
	2nd	7.3 Classification of bridges 7.4 Requirements of an ideal bridge
	3rd	8.0 Bridge Site investigation, hydrology & planning 8.1 Selection of bridge site
	4th	8.2 Bridge alignments 8.3 Determination of flood discharge
11th	1st	8.4 Waterway & economic span
	2nd	8.5 Afflux, clearance & free board
	3rd	8.6 Collection of bridge design data & sub surface investigation
	4th	9.0 Bridge foundation 9.1 Scour depth minimum depth of foundation
12th	1st	9.1 Scour depth minimum depth of foundation

	2nd	9.2 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caisson foundation
	3rd	9.2 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caisson foundation
	4th	9.2 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caisson foundation
13th	1st	9.2 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caisson foundation
	2nd	9.3 Cofferdams
	3rd	10.0 Bridge substructure and approaches 10.1 Types of piers
	4th	10.2 Types of abutments
14th	1st	10.2 Types of abutments
	2nd	10.3 Types of wing walls
	3rd	10.4 Approaches
	4th	11.0 Permanent bridges 11.1 Masonry bridges
15th	1st	11.2 Steel bridges – classification with sketches
	2nd	11.3 Concrete bridges – classification, brief description with sketches 11.4 IRC bridge loading
	3rd	12.0 Culvert & cause ways 12.1 Types of culverts - brief description
	4th	12.2 Types of causeways - brief description

LESSON PLAN OF TH.5 STRUCTURAL DESIGN– II

Discipline: Civil Engineering	Semester : 5TH	Name of the Teaching Faculty:
Week	Class Day	Theory/ Practical Topics
1ST		1.0 Introduction
	1ST	1.1 Common steel structures, Advantages & disadvantages of steel structures. 1.2 Types of steel, properties of structural steel.
	2ND	1.3 Rolled steel sections, special considerations in steel design. 1.4 Loads and load combinations
	3RD	1.5 Structural analysis and design philosophy. 1.6 Brief review of Principles of Limit State design.
		2.0 Structural Steel Fasteners and Connections
	4TH	2.1 Bolted Connections. 2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.
	5TH	2.1.2 Different terminology, spacing and edge distance of bolt holes
2ND	1ST	2.1.3 Types of bolted connections. 2.1.4 Types of action of fasteners, assumptions and principles of design.
	2ND	2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity& bearing capacity), reduction factors, and shear capacity of HSFG bolts.
	3RD	2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces) 2.1.7 Efficiency of a joint.
	4TH	2.2 Welded Connections: 2.2.1 Advantages and Disadvantages of welded connection. 2.2.2 Types of welded joints and specifications for welding.
	5TH	2.2.3 Design stresses in welds.
3RD	1ST	2.2.4 Strength of welded joints. 2.2.5 Reduction of design stresses for long joints
		3.0 Design of Steel tension Members
	2ND	3.1 Common shapes of tension members.
	3RD	3.2 Design strength of tension members
	4TH	Questions and Answer
	5TH	3.2 Yielding of gross cross section
4TH	1ST	rupture of critical section and the concept of block shear.

	2ND	3.3 Maximum values of effective slenderness ratio.
	3RD	3.4 Analysis and Design of tension members.
	4TH	Questions and Answer
		4.0 Design of Steel Compression members
	5TH	4.1 Common shapes of compression members.
5TH	1ST	Discussion from IS 800 code
	2ND	4.2 Bulking class of cross sections and slenderness ratio.
	3RD	Questions and Answer
	4TH	4.3 Design compressive stress and strength of compression members.
	5TH	Questions and Answer
6TH	1ST	4.4 Analysis of compression members (axial load only).
	2ND	Questions and Answer
	3RD	4.4 Design of compression members (axial load only)
	4TH	Questions and Answer
		5.0 Steel Column bases and foundations
	5TH	5.1 Types of column bases and their suitability
7TH	1ST	5.2 Design of slab base (subjected to axial loading) with concrete footing.
	2ND	Discussion from IS 800 code
	3RD	Questions and Answer
	4TH	5.3 Design of gusseted base (subjected to axial loading) with concrete footing.
	5TH	Discussion from IS 800 code
8TH	1ST	Questions and Answer
	2ND	Questions and Answer
		6.0 Design of Steel beams
	3RD	6.1 Common cross sections and their classification.
	4TH	6.2 Plastic moment capacity of sections, moment capacity and shear resistance.
	5TH	Questions and Answer
9TH	1ST	6.3 Deflection limits, web buckling and web crippling.
	2ND	6.4 Design of laterally supported beams against bending and shear
	3RD	Questions and Answer
	4TH	6.5 Types of built up sections and design of simple built up sections using flange plates with I-sections or web plates.
	5TH	Questions and Answer
10TH		7.0 Design of Tubular Steel structures
	1ST	7.1 Round tubular sections, permissible stresses.

	2ND	7.2 Tube columns and compression members, crinkling.
	3RD	7.3 Tube tension members and tubular roof trusses.
	4TH	7.4 Joints in tubular trusses
	5TH	7.5 Design of tubular beams and purlins.
11TH	1ST	Questions and Answer
		8.0 Design of Timber Structures
	2ND	8.1 Types of timber, grading of timber, defects
	3RD	permissible stresses.
	4TH	8.2 Design of axially loaded timber columns (solid, box & built up section except spaced columns).
	5TH	Questions and Answer
12TH	1ST	Questions and Answer
	2ND	8.3 Design of simple timber structural elements in flexure (Solid sections & flitched beams, form factor)
	3RD	Questions and Answer
	4TH	moment of resistance of built-up sections
	5TH	Questions and Answer
13TH	1ST	check for shear
	2ND	bearing and deflection
	3RD	Questions and Answer
		9.0 Design of Masonry Structures
	4TH	9.1 Design consideration for masonry walls (a) Load bearing walls -Permissible stresses
	5TH	Slenderness ratio, Effective length
15TH	1ST	Questions and Answer
	2ND	Effective height, Effective thickness
	3RD	Questions and Answer
	4TH	Eccentricity of loads, Grade of mortar
	5TH	Questions and Answer
16TH	1ST	(b) Non-Load bearing walls – Panel walls, Curtain walls, Partition walls.
	2ND	9.2 Design consideration for masonry columns, piers and buttresses.
	3RD	Questions and Answer
	4TH	9.3 Design considerations for masonry wall footings.
	5TH	Questions and Answer