

GOVT. POLYTECHNIC BERHAMPUR
LESSON PLAN - 2025-2026 (Summer)

Discipline :- CIVIL ENGINEERING	Semester :- FOURTH (S) 2025-26	Name of the teaching Faculty : SIBANI SAHU
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SUBJECT:- HYDRAULICS & IRRIGATION ENGINEERING	NO. OF CLASSES ALLOTTED FOR WEEK	SEMESTER FROM :- FROM 22/12/2025 TO 18/04/2026
WEEK	DAY	THEORY
1ST	1st	1.1 - Technical terms used in Hydraulics , ideal and real fluid. 1.2 - Application of hydraulics. Physical properties of fluid. Newton's law of viscosity.
	2nd	1.3 – Various types of pressure. Concept of Pressure head and its unit. Variation of pressure with depth. 1.4 - Pascal's law of fluid pressure and its uses.
	3rd	1.5 - Measurement of differential Pressure by different methods, center of pressure on immersed surfaces and on tank walls. Determination of total pressure and center of pressure on sides and bottom of water tanks. 1.6- Determination of total pressure and center of pressure on sides and bottom of water tanks.
2ND	1st	1.7 - Types of flow, Discharge and its unit. 1.8 continuity equation of flow. Energy of flowing liquid. Statement of Bernoulli's theorem, assumptions, equation.
	2nd	1.9 -- Major head loss in pipe by Darcy's Weisbach equation, 2.0 - Minor losses in pipe, sudden enlargement.
	3rd	2.1 - Flow through pipes in series, pipes in parallel and Dupuit's equation for equivalent pipe. 2.2 – Hydraulic gradient line and total energy line. 2.2 - Discharge measuring device for pipe flow, Venturi meter construction and working.
3RD	1st	2.3 - Discharge measuring device for pipe flow, Venturi meter construction and working. 2.4 - Discharge measurement using Orifice, Hydraulic Coefficients of Orifice.
	2nd	2.5 - Geometrical properties of rectangular and trapezoidal channel section. 2.6 -Determination of discharge by Chezy's equation and Manning's equation.
	3rd	2.7 – Conditions for most economical rectangular and trapezoidal channel section. 2.8 - Discharge measuring device through Triangular and rectangular Notches.
4TH	1st	2.9- Velocity measurement devices through current meter, floats and Pitot's tube. 3.0- Specific energy diagram, Froudes' Number.

	2nd	3.1- Concept of pump, Types of pump. 3.2- Components and working of centrifugal and reciprocating pump.
	3rd	3.3 - Suction head, delivery head, static head, Manometric head. 3.4 - Power of centrifugal pump, Selection and choice of pump.
5TH	1st	3.5 - Definition of Hydrology and Hydrological cycle. 3.6 - Rain Gauge, types of rain gauge.
	2nd	3.7 - Methods of calculating average rainfall. 3.8 - Runoff, Factors affecting Run off, Computation of runoff.
	3rd	3.9- Maximum Flood Discharge measurement .Rational and empirical methods. 4.0 - Yield and Dependable yield of a catchment, determination of dependable yield.
6TH	1st	4.1- Irrigation and its classification. Crop Water requirement. 4.2- Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, Numericals.
	2nd	4.3- Methods of application of irrigation water and its assessment. 4.4 - Area capacity curve. Silting of reservoir, Rate & factors.
	3rd	4.5 - Control levels in reservoir, Simple numerical problems on Fixing Control levels. 4.6 - Dams and its classification: Earthen dams and Gravity dams.
7TH	1st	4.7- Components & function of Earthen dam, typical cross section, seepage through embankment and foundation and its control. 4.8 - Methods of construction of earthen dam..
	2nd	4.9- Types of failure of earthen dam and preventive measures. 5.0 - Gravity Dams, Forces acting on dam.
	3rd	5.1- Profile, typical cross section, drainage gallery, joints in gravity dam, concept of high dam and low dam.
8TH	1st	5.1 - Definition, function, location, types and components of Spillways, Energy dissipaters.
	2nd	5.2 - Components, parts, types of Weir. 5.3- K.T. weir - components and construction.
	3rd	5.4 - Layout, components of Diversion head work and their function. 5.5- Components and functions of Barrages. Difference between weir and Barrage.
9TH	1st	5.6- Classification of Canal according to alignment and position in the canal network.
	2nd	5.7 - Cross section of canal in embankment and cutting, partial embankment and cutting.
	3rd	5.8 - Balancing depth, Canal lining. 5.9- Purpose, material used and its properties, advantages.

10TH	1st	5.9- - Types of Cross Drainage works.
	2 nd	6.0- Types of cross drainage work.
	3 rd	6.1 – Cross section of canal in embankment and cutting.
11TH	1 st	6.2- Partial embankment and cutting.
	2 nd	6.3 - Balancing depth, Canal lining.
	3 rd	6.4-Purpose, material used and its properties, advantages.
12TH	1 st	6.5-Details about Aqueduct, siphon aqueduct.
	2 nd	6.6- Super passage, level crossing.
	3 rd	6.7-Concept of Canal regulators.
13TH	1 st	6.8-Head regulator.
	2 nd	6.9 – Cross regulator, Escape, Falls and Outlets.
	3 rd	6.3- Practice Numericals.
14TH	1 st	6.4- Numericals on manometer, head loss of pipe.
	2 nd	6.5- Problems on spillways.
	3 rd	6.6- Problems on computation of runoff.
15TH	1 st	6.7- Numericals based on the gravity dam.
	2 nd	6.8- Types of flood discharge.
	3 rd	6.9- Planning of design of simple irrigation regulatory structures.

Sobani Sahu

G.F (CIVIL)

DT -19.12.2025

LESSON PLAN THEORY OF STRUCTURE (Th.2)

Discipline: Civil Engineering	Semester: 4th	Name of the Teaching Faculty: SUSHREE SASMITA SAHOO
Subject: Th.2 THEORY OF STRUCTURE	No. of days/ per week class allotted: 3	Semester From Date : 22/12/2025 To Date: 18/04/2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		1. Direct and Bending Stresses in vertical members
1st	1st	Introduction to axial and eccentric loads, eccentricity about one principal axis only, nature of stresses
	2nd	Maximum and minimum stresses, resultant stresses and distribution diagram.
	3rd	Condition for no tension or zero stress at extreme fiber, Limit of eccentricity
2nd	1st	core of section for rectangular and circular cross sections, Middle third rule.
	2nd	Chimneys of circular cross section subjected to wind pressure, Maximum and minimum stresses
	3rd	resultant stresses and distribution diagram at base
3rd	1st	Analysis of dams subjected to horizontal water pressure, conditions of stability
	2nd	Maximum and minimum stresses, resultant stresses and distribution diagram at base.
	3rd	2. Slope and Deflection
4th	1st	Concept of slope and deflection, stiffness of beams, Relation among bending moment
	2nd	slope, deflection and radius of curvature
	3rd	Double integration method to find slope and deflection of cantilever and simply supported beams subjected to concentrated load and uniformly distributed load on entire span.
5th	1st	Double integration method to find slope and deflection of cantilever and simply supported beams subjected to concentrated load and uniformly distributed load on entire span.
	2nd	Macaulay's method for slope and deflection
	3rd	application to cantilever and simply supported beam subjected to concentrated and uniformly distributed load on entire span.
	1st	application to cantilever and simply supported beam subjected to concentrated and uniformly distributed load on entire span.

6th		3.Determinate and Indeterminate structures (Fixed and Continuous Beam)
	2nd	Concept of Determinate and Indeterminate structures
	3rd	Concept of fixity, effect of fixity, advantages and disadvantages of fixed beam over simply supported beam.
7th	1st	Principle of superposition, Fixed end moments from first principle for beam subjected to point load, UDL over entire span.
	2nd	Application of standard formulae in finding end moments, end reactions and drawing S.F. and B.M. diagrams for a fixed beam.
	3rd	Application of standard formulae in finding end moments, end reactions and drawing S.F. and B.M. diagrams for a fixed beam.
8th	1st	Definition, effect of continuity, nature of moments induced due to continuity, concept of deflected shape, practical examples.
	2nd	Clapeyron's theorem of three moment (no derivation), Application of Clapeyron's theorem maximum up to three spans and two unknown support moment only, Support at same level spans having same and uniform moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span.
	3rd	Clapeyron's theorem of three moment (no derivation), Application of Clapeyron's theorem maximum up to three spans and two unknown support moment only, Support at same level spans having same and uniform moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span.
9th	1st	Concept of influence line diagram (ILD)
		4. Moment distribution method
	2nd	Introduction to moment distribution method, sign convention, Carry over factor, stiffness factor, distribution factor.
	3rd	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
10th	1st	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
	2nd	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.

	3rd	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
11th	1st	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
	2nd	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
	3rd	Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
12th	1st	Introduction to portal frames – Symmetrical and unsymmetrical portal frames with the concept of Bays and stories.
		5.Simple trusses
	2nd	Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss)
	3rd	Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss)
13th	1st	Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss)
	2nd	Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light truss, King post and Queen post truss)
	3rd	Calculate support reactions for trusses subjected to point loads at joints
14th	1st	Calculate support reactions for trusses subjected to point loads at joints
	2nd	Calculate support reactions for trusses subjected to point loads at joints
	3rd	Calculate forces in members of truss using Method of joints and Method of sections.
15th	1st	Calculate forces in members of truss using Method of joints and Method of sections.
	2nd	Probable Question Answer discussion for Semester exam
	3rd	Probable Question Answer discussion for Semester exam

Sushree Sasmita Sahoo
Lecturer stage-11, CIVIL
19/12/2025

**LESSON PLAN:TH:3- ESTIMATING COSTING AND VALUATION
GOVT. POLYTECHNIC, BERHAMPUR**

Discipline: Civil Engineering	Semester: 4TH	Name of the Teaching Faculty: Narasingh Mahanty
Subject: TH:3- ESTIMATING COSTING AND VALUATION	No. of days/ per week class allotted: 3	Semester From Date : 22.12.2025 to Date: 18.04.2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st	UNIT-I Fundamentals of Estimating and Costing Estimating and Costing – Meaning, purpose, Administrative approval, Technical Sanction
	2nd	Types of methods of estimates – Approximate and Detailed estimate.
	3rd	Roles and responsibility of Engineers at different positions/levels, Administrative set ups and heirarchy of Engineering Dept. in State Govt./Central Govt./PSUs
2nd	1st	Roles and responsibility of Engineers at different positions/levels, Administrative set ups and heirarchy of Engineering Dept. in State Govt./Central Govt./PSUs
	2nd	Standard formats of Measurement sheet, Abstract sheet, Modes of measurement and desired accuracy in measurements for different items of work as per IS:1200.
	3rd	Rules for deduction in different category of work as per IS:1200. Description / specification of items of building work as per OPWD /DSR./CPWD/Railways
3rd	1st	UNIT-II Detailed Estimate- Definition and Purpose, Data required for detailed estimate - Civil cost, GST, Contingencies, Supervision charges,
	2nd	Procedure for preparation of detailed estimate
	3rd	Long wall and Short wall method, Centre line method.
4th	1st	Bar bending schedule for footing, column, beam, Lintel, chajja and slab elements
	2nd	Bar bending schedule for footing, column, beam, Lintel, chajja and slab elements
	3rd	Provisions in detailed estimate: contingencies, work charged establishment,
5th	1st	percentage charges, water supply and sanitary Charges and electrification charges etc.
	2nd	Prime cost, Provisional sum, Provisional quantities, Bill of quantities, Spot items or Site items.
	3rd	Detailed estimate of residential buildings using long wall short wall method

6th	1st	Detailed estimate of residential buildings using long wall short wall method
	2nd	Detailed estimate of residential buildings using long wall short wall method
	3rd	Detailed estimate of residential buildings using long wall short wall method
7th	1st	Detailed estimate of residential buildings using centre line method
	2nd	Detailed estimate of residential buildings using centre line method
	3rd	Detailed estimate of residential buildings using centre line method
8th	1st	Detailed estimate of residential buildings using centre line method
	2nd	UNIT -III Estimate for Civil Engineering Works Earthwork - Quantities for roads, Embankment and canal by – Mid sectional area method,.
	3rd	Earthwork - Quantities for roads, Embankment and canal by – , mean sectional area method.
9th	1st	Earthwork - Quantities for roads, Embankment and canal by – , Prismoidal and trapezoidal formula method.
	2nd	Detailed estimate for septic tank,
	3rd	Estimate of RCC culvert ,
10th	1st	Estimate of RCC culvert ,
	2nd	Estimate of , drainage syphon
	3rd	Estimate of , drainage syphon
11th	1st	Estimate of vertical fall
	2nd	Estimate of vertical fall
	3rd	Estimate of Bituminous road
12th	1st	Estimate of Bituminous road
	2nd	UNIT-IV Rate Analysis Rate Analysis: Definition, purpose and importance.
	3rd	Lead (Standard and Extra), lift, overhead charges, water charges and contractors' profit,
13th	1st	procedure for rate analysis.
	2nd	Task work- Definition, types. Task work of different skilled labour for different items.
	3rd	Categories of labours, their daily wages, types and number of labours for different items of work.
14th	1st	Transportation charges of materials - Lead and Lift, Hire charges of machineries and equipment.
	2nd	Transportation charges of materials - Lead and Lift, Hire charges of machineries and equipment.
	3rd	Preparing rate analysis of different items of work pertaining to buildings and roads. (Different items of work like PCC, Plastering, Flooring, and Brick work)

15th	1st	Preparing rate analysis of different items of work pertaining to buildings and roads. (Different items of work like PCC, Plastering, Flooring, and Brick work)
	2nd	Preparing rate analysis of different items of work pertaining to buildings and roads. (Different items of work like PCC, Plastering, Flooring, and Brick work)
	3rd	Revision and Previous Year Question Discussion

Manasungh Mahankaly
C.F. Civil Dept
Dt - 19-12-2025

**LESSON PLAN OF Th4. CONSTRUCTION MANAGEMENT FOR THE SESSION
2025-26(SUMMER-2025) GOVT. POLYTECHNIC, BERHAMPUR**

Discipline: Civil Engineering	Semester: 4TH	Name of the Teaching Faculty: A GUPTESWAR PATRA
Subject: Th4. CONSTRUCTION MANAGEMENT	No. of days/ per week class allotted: 3	Semester From Date : 22-12-2025 to Date: 18-04-2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		Construction industry and management
1st	1st	• Organization-objectives, principles of organization, types of organization: government/public and private construction industry,
	2nd	• Organization-objectives, principles of organization, types of organization: government/public and private construction industry,
	3rd	Role of various personnel in construction organization
2nd	1st	Agencies associated with construction work- owner, promoter, builder, designer, architects.
	2nd	Role of consultant for various activities: Preparation of Detailed Project Report (DPR),
	3rd	monitoring of progress and quality, settlement of disputes.
3rd	1st	Site Layout • Principles governing site layout.
	2nd	• Principles governing site layout.
	3rd	• Factors affecting site layout.
4th	1st	• Factors affecting site layout.
	2nd	• Preparation of site layout.
	3rd	• Preparation of site layout.
5th	1st	• Land acquisition procedures and providing compensation.
	2nd	• Land acquisition procedures and providing compensation.
	3rd	Planning and scheduling • Identifying broad activities in construction work & allotting time to it, Methods of Scheduling,
6th	1st	• Identifying broad activities in construction work & allotting time to it, Methods of Scheduling,
	2nd	• Identifying broad activities in construction work & allotting time to it, Methods of Scheduling,
	3rd	Development of bar charts, Merits & limitations of bar chart.
7th	1st	Elements of Network: Event, activity, dummy activities, Precautions in drawing Network, Numbering the events.
	2nd	Elements of Network: Event, activity, dummy activities, Precautions in drawing Network, Numbering the events.
	3rd	CPM networks, activity time estimate, Event Times by forward & backward pass calculation, start and finish time of activity, project duration

8th	1st	CPM networks, activity time estimate, Event Times by forward & backward pass calculation, start and finish time of activity, project duration
	2nd	Floats: Types of Floats Free, independent and total floats, critical activities and critical path,
	3rd	Floats: Types of Floats Free, independent and total floats, critical activities and critical path,
9th	1st	Purpose of crashing a network, Normal Time and Cost, Crash Time and Cost, Cost slope, Optimization of cost and duration.
	2nd	Purpose of crashing a network, Normal Time and Cost, Crash Time and Cost, Cost slope, Optimization of cost and duration.
	3rd	Material Management- Ordering cost, inventory carrying cost, Economic Order Quantity
10th	1st	Store management, various records related to store management, inventory control by ABC technique
	2nd	Store management, various records related to store management, inventory control by ABC technique
	3rd	Introduction to material procurement through portals (e.g. www.inampro.nic.in).
11th	1st	Construction Contracts and Specifications • Types of Construction contracts
	2nd	• Types of Construction contracts
	3rd	• Contract documents, specifications, general special conditions
12th	1st	• Contract documents, specifications, general special conditions
	2nd	• Contract documents, specifications, general special conditions
	3rd	• Contract Management, procedures involved in arbitration and settlement (Introduction only)
13th	1st	• Contract Management, procedures involved in arbitration and settlement (Introduction only)
	2nd	Safety in Construction • Safety in Construction Industry—Causes of Accidents,
	3rd	• Safety in Construction Industry—Causes of Accidents
14th	1st	• Labour Laws and Acts pertaining to Civil construction activities (Introduction only)
	2nd	• Labour Laws and Acts pertaining to Civil construction activities (Introduction only)
	3rd	• Labour Laws and Acts pertaining to Civil construction activities (Introduction only)
15th	1st	REVISION CLASSES
	2nd	REVISION CLASSES
	3rd	REVISION CLASSES

A. Gupreswar Patil
B.E. (Civil)
12/12/25

LESSON PLAN OF Th5. DESIGN OF DESIGN OF STEEL STRUCTURES FOR THE SESSION 2025-26 (SUMMER-2025), GOVT. POLYTECHNIC, BERHAMPUR

Discipline: Civil Engineering	Semester: 4TH	Name of the Teaching Faculty : RUPELI KUMARI PATRO
Subject: DESIGN OF STEEL STRUCTURES (Th.5)	No. of days/ per week class allotted: 3	Semester From Date : 22-12-2025 to Date: 18-04-2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
		Design of connections in steel structures
1st	1st	• Types of connection, bolted connection, Strength of bolted joints,
	2nd	• Types of connection, bolted connection, Strength of bolted joints,
	3rd	• Design of bolted joints for axially loaded members
2nd	1st	• Design of bolted joints for axially loaded members
	2nd	• Types of weld, welded connections, Permissible stresses in weld, Strength of weld.
	3rd	• Types of weld, welded connections, Permissible stresses in weld, Strength of weld.
3rd	1st	• Types of weld, welded connections, Permissible stresses in weld, Strength of weld.
	2nd	• Advantages and disadvantages of weld, Design of fillet weld and butt weld for axial load.
	3rd	• Advantages and disadvantages of weld, Design of fillet weld and butt weld for axial load.
4th	1st	• Advantages and disadvantages of weld, Design of fillet weld and butt weld for axial load.
	2nd	Design of Steel Tension (Limit State Method) • Types of sections used for Tension members.
	3rd	• Types of sections used for Tension members.
5th	1st	• Types of sections used for Tension members.
	2nd	• Strength of tension member by- yielding of section, rupture of net cross-section and block shear.
	3rd	• Strength of tension member by- yielding of section, rupture of net cross-section and block shear.
6th	1st	• Strength of tension member by- yielding of section, rupture of net cross-section and block shear.
	2nd	• Design of axially loaded single angle and double angle tension members with bolted and welded connections.
	3rd	• Design of axially loaded single angle and double angle tension members with bolted and welded connections.

7th	1st	• Design of axially loaded single angle and double angle tension members with bolted and welded connections.
	2nd	• Design of axially loaded single angle and double angle tension members with bolted and welded connections.
	3rd	Design of Steel Compression Members (Limit State Method) Types of sections used as compression member
8th	1st	• Types of sections used as compression member
	2nd	Calculation of effective length, Radius of gyration and slenderness ratio, Permissible values of slenderness ratio as per IS 800-2007,
	3rd	Calculation of effective length, Radius of gyration and slenderness ratio, Permissible values of slenderness ratio as per IS 800-2007,
9th	1st	Design compressive stress, 15 Design of column bases for axially loaded columns only.
	2nd	Design compressive stress, 15 Design of column bases for axially loaded columns only.
	3rd	• Introduction to built up sections, lacing and battening (Meaning and purpose), Diagrams of single and double lacing and battening system. (No numerical problems).
10th	1st	• Introduction to built up sections, lacing and battening (Meaning and purpose), Diagrams of single and double lacing and battening system. (No numerical problems).
	2nd	• Introduction to built up sections, lacing and battening (Meaning and purpose), Diagrams of single and double lacing and battening system. (No numerical problems).
	3rd	• Introduction to built up sections, lacing and battening (Meaning and purpose), Diagrams of single and double lacing and battening system. (No numerical problems).
11th	1st	• Design of axially loaded single and double angle struts connected by bolted and welded connections with gusset plate.
	2nd	• Design of axially loaded single and double angle struts connected by bolted and welded connections with gusset plate.
	3rd	• Design of axially loaded single and double angle struts connected by bolted and welded connections with gusset plate.
12th	1st	• Design of axially loaded single and double angle struts connected by bolted and welded connections with gusset plate.
	2nd	Design of Steel beams (Limit State Method) • Standard beam sections, Bending stress calculations.
	3rd	• Standard beam sections, Bending stress calculations.
13th	1st	• Design of simple I and channel section.
	2nd	• Design of simple I and channel section.
	3rd	• Check for shear as per IS 800 2007
14th	1st	• Check for shear as per IS 800 2007
	2nd	• Simple and built up sections,
	3rd	• Simple and built up sections,
15th	1st	• Simple and built up sections,
	2nd	• Introduction to plate girder: Components and functions (no numerical
	3rd	• Introduction to plate girder: Components and functions (no numerical

Rupali Kumari Patil (C.G.F of
19/12/2025 Civil dept)