



**DEPARTMENT OF CIVIL ENGINEERING**  
**GOVERNMENT POLYTECHNIC SUNDERNAGAR**

**LESSON PLAN FOR Design of RCC Structures (SEMESTER-5TH)SESSION: (Aug-Dec 2024)**

S.No.	MONTH	WEEK	CONTENTS	REMARKS
1	August	Week 2	<b>UNIT-I Introduction to R.C.C Designing using Limit State Method :</b>	
		Week 3	Design Philosophies: Working Stress Theory, Ultimate Design Theory, Limit State Theory Concept of Reinforced Cement Concrete (RCC) Reinforcement Materials:	
		Week 4	Suitability of Steel as reinforcing material. Properties of mild steel and HYSD steel, Loading on structure as per I.S 875 Study of BIS:456-2000-clause5, clause6, clause9, Clause18, clause19, clause22, clause 23.0, 23.2, 23.3, Clause25, clause26, clause35, clause36, clause37, clause 38, clause 39, clause 40, clause 41, clause42, clause 43, Annexure-B, C, D, E, G	
		Week 5	<b>UNIT-II Shear, Bond, and Development Length (LSM) :</b> Nominal Shear stress in R.C. Section, Design shear strength of concrete, maximum shear stress, Design of shear reinforcement, Minimum shear reinforcement, Forms of shear reinforcement with numerical problems	
2	September	Week 1	Bond and types of bonds, Bond Stress, check for bond stress, Development length in tension and compression, anchorage value for hooks 90° bend and 45° bend. Standard Lapping of bars, check for development length.	
		Week 2	Determination of development length required for tension reinforcement of cantilevers beam and slab, check for development length. <b>Class Test -1 Will be held this week.</b>	
		Week 3	<b>UNIT-III Analysis and Design of Singly Reinforced Sections:</b> Limit State of collapse (Flexure), Assumption stress. Strain relationship for concrete and steel, neutral axis, Stress block diagram and Strain diagram for singly reinforced section.	
		Week 4	Concept of under- reinforced, over-reinforced and balanced section, neutral axis, limiting value of moment of resistance and limiting percentage of steel required for balanced singly R.C. Section. Simple numerical problems on determining design constants, moment of resistance and area of steel.Design of Singly reinforced simply supported beam and cantilever beam.	

		Week 5	<b>UNIT-IV Analysis and Design of Doubly Reinforced Sections (LSM):</b> General features, necessity of providing doubly reinforced reinforcement, limitations. Analysis of doubly reinforced section, strain diagram, stress diagram, depth of neutral axis, moment of resistance of the section. Numerical problems on finding moment of resistance.	
3	October	Week 1	<b>UNIT-V Design of One-Way Slab (LSM):</b> Analysis of simply supported one-way slab.	
		Week 2	Design of simply supported one-way slab.	
		Week 3	<b>UNIT-VI Two Way Slab (LSM): Class Test -2 Will be held this week.</b>	
		Week 4	Design of two-way simply supported slab with corners free & no provision for torsion reinforcement.	
		Week 5	<b>UNIT-VII Design of Axially Loaded Column (LSM) :</b>	
4	November	Week 1	Assumptions in limit state of collapse-compression : Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square, and circular sections, diameter and spacing of lateral ties. (No numerical on helical ties).	
		Week 2	<b>House Test will be held this week</b>	
		Week 3	Analysis and Design of axially loaded: Uniaxial & Biaxial Bending along with axial loading: short, square, rectangular, and circular columns with lateral ties only; check for short column and check for minimum eccentricity may be applied.	
		Week 4	Revision of Previous Year Question Papers	
		Week 5	Revision of Previous Year Question Papers	
5	December	Week 1	Doubt Clearing Sessions & Discussion on Previous Years Question Papers	


  
 Signature of Teacher  
 (Er Ishan Sharma)


  
 Signature of H.O.D  
 (Er Tanmay Kapoor)

DEPARTMENT OF CIVIL ENGINEERING  
GOVERNMENT POLYTECHNIC SUNDERNAGAR

LESSON PLAN FOR Estimating & Costing (SEMESTER-5TH)SESSION: (Aug-Dec 2024)			REMARKS
S.No.	MONTH	WEEK	CONTENTS
1	August	Week 2	<b>Unit I: Introduction</b> Meaning of the terms estimating & costing. Purpose of estimating and costing
		Week 3	Types of Estimates Approximate and Detailed Approximate estimate Types Plinth area rate method Cubic Content method Approximate Quantity method Types of detailed estimate Detailed estimate for new work Revised estimate Supplementary estimate Repair & Maintenance estimate
		Week 4	<b>Unit II: Measurement</b> Units of measurement for various items of work as per BIS: 1200
		Week 5	Rules for measurements. Different methods of taking out quantities—centre line method and long wall and short wall method.
		Week 1	<b>Unit III: Preparation of Detailed Estimates and Abstract of Cost for One room residential building with flat roof</b>
2	September	Week 2	Two room residential building with flat roof. <b>Class Test -1 Will be held this week.</b>
		Week 3	Septic tank for 10 users
		Week 4	<b>Unit IV: Road Estimation:</b> Preparation of Detailed Estimates and Abstract of Cost for Plain road with-mid section area method, mean sectional area method, prismatic formula.
		Week 5	Earth work in hill road.
		Week 1	<b>Unit V: Analysis of Rates:</b> Calculation of Quantities of Materials Cement mortars of different proportion Cement concrete of different proportion RCC work in different proportions
3	October	Week 2	Brick/stone masonry in cement mortar Plastering and pointing Whitewashing, painting
		Week 3	Preparation of Detailed Analysis of Rates for finished items with given labour and rate of material : Earthwork Cement concrete of different proportion RCC work in different proportions. <b>Class Test -2 Will be held this week.</b>
		Week 4	Brick/stone masonry in cement mortar Plastering and pointing Whitewashing, painting

		Week 5	Unit VI: Contracts And Tendering : Meaning of contract Qualities of a good contractor and their qualifications. Essentials of a contract Types of contracts, their advantages, disadvantages and suitability, system of payment.	
4	November	Week 1	Single and two cover-bids Tender, tender forms and documents, tender notice, submission of tender and deposit of earnest money, security deposit, retention money, maintenance period Administrative approval, Technical sanction, Budget provision, Expenditure sanction.	
		Week 2	<b>House Test will be held this week</b>	
		Week 3	Methods for carrying out works- contract method. Preparation of Tender Document based on Common Schedule Rates (CSR) Introduction to CSR and calculation of cost based on premium on CSR.	
		Week 4	Revision of Previous Year Question Papers	
		Week 5	Revision of Previous Year Question Papers	
5	December	Week 1	Doubt Clearing Sessions & Discussion on Previous Years Question Papers	

  
Signature of Teacher  
(Er Garima Sharma)

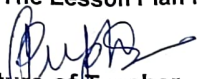
  
Signature of H.O.D  
(Er Tanmay Kapoor)


**Department of Civil Engineering**  
**Government Polytechnic Sundernagar Distt Mandi (H.P) -175018**

Lesson Plan for Water Resource Engineering (Theory) (Semester- 5th ) Session: (August- Dcember, 2024)				
S.No	MONTH	WEEK	CONTENTS	REMARKS
1	August	3	Unit-I Introduction to Hydrology Hydrology: Definition and Hydrological cycle Rain Gauge: Symons rain gauge, automatic rain gauge	
		4	Methods of calculating average rainfall: Arithmetic mean, Iso-hyetal, and Thiessen polygon method.	
		5	Runoff, Factors affecting Runoff, Computation of run-off.	
2	September	1	Unit-II Crop water requirement and Reservoir Planning Irrigation and its classification. Crop Water requirement: Cropping seasons, Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty,	
		2	Problems on water requirement Methods of application of irrigation water and its assessment. Silting of reservoir, Rate of silting, factors affecting silting and control measures. <b>Class Test - I as per academic calender issued by HPTSB.</b>	
		3	Unit-III Dams and Spillways Dams and its classification: Earthen dams and Gravity dams (masonry and concrete). Earthen Dams- Components with function, typical cross-section, seepage through embankment and foundation and its control.	
		4	Methods of construction of earthen dam, types of failure of earthen dam and preventive measures.	
3	October	1	Gravity Dams-Forces acting on dam, Theoretical and practical profile, typical cross-section. (only theoretical concept) Spillways-Definition, function & location	
		2	Unit-IV Minor and Micro Irrigation Lift irrigation Scheme-Components and their functions, Layout. Drip and Sprinkler Irrigation-Need, components, and Layout.	
		3	Well irrigation: types and yield of wells, advantages and disadvantages of well irrigation. <b>Class Test - II as per academic calender issued by HPTSB.</b>	
		4	Unit-V Diversion Head Works &Canals Weirs-components, parts, types of weirs Barrages-components and their functions. Difference between weir and Barrage.	
		5	Canals- Classification according to alignment and position in the canal network, Cross section of canal in embankment and cutting, partial embankment and cutting.	

4	November	1	Canal lining-Purpose, material used and its properties, advantages. Cross Drainage Works-Aqueduct, siphon aqueduct, super passage, level crossing. Canal Regulators-Head regulator, Cross regulator, Escape, Falls and Outlets	
		2	House Test (Centralized) as per academic calender issued by HPTSB.	
		3	Unit-VI Water logging Definition, Causes, Preventive & remedial measures, Reclamation of waterlogged areas	
		4	Revision of Unit 1 to Unit 3	
		5	Revision of Unit 4 to Unit 6	

Note:- The Lesson Plan is tentative, subject to availaibility of time,students & faculty.

  
Signature of Teacher  
(Er Pratik Gupta)

  
Signature of H.O.D  
(Er Tanmay Kapoor)

**Lesson Plan for Earthquake Resistant Building Design (Theory) (Semester- 5th ) Session: (August- Dcember, 2024)**

S.No	MONTH	WEEK	CONTENTS	REMARKS
1	August	3	Unit I: Elements of Engineering Seismology General features of tectonic of seismic regions Causes of earthquakes , Seismic waves	
		4	Earth quake size (magnitude and intensity), Epicenter, Seismograph, Classification of earthquakes Seismic zoning map of India	
		5	Unit II: Seismic Behaviour of Traditionally-Built Constructions of India Earth quake effects Traditionally built construction in India Performance of building during earthquakes and Mode of failure (Out of plane failure, in plane failure	
2	September	1	Diaphragm failure, Connection failure, Non-structural components failure)	
		2	Unit III: Introduction to IS1893 (Part-I)-2016 Introduction , Assumptions , Design lateral forces and their calculation methods <b>Class Test - I as per academic calender issued by HPTSB.</b>	
		3	Unit IV: Ductile Detailing of Reinforced Concrete Buildings (IS 13920-2016) & IS 4326-2013) Common modes of failure in reinforced concrete buildings	
		4	General Principal for earthquake resistant buildings & Special construction features Types of irregularities Vertical irregularities Plan irregularities	
		5	Ductile detailing as per code Seismic strengthening arrangements, Horizontal reinforcement ,Vertical reinforcement	
3	October	1	Unit V: Introduction to IS13828-1993 & IS13827-1993 Advantages and disadvantages of masonry construction	
		2	Behaviour of masonry construction during earthquakes Earthquake resistance features for burnt clay brick in weak mortar	
		3	Codal Provisions for earthquake resistant earthen construction <b>Class Test - II as per academic calender issued by HPTSB.</b>	
		4	Seismic strengthening features of earthen buildings Unit VI: Retrofitting Measure for Traditionally Built Construction Introduction, need of retrofitting, Retrofitting materials	
		5	Retrofitting measure of traditionally built construction ,Retrofitting of masonry buildings	
4	November	1	Retrofitting of concrete structure, Retrofitting of low-cost buildings	
		2	<b>House Test (Centralized) as per academic calender issued by HPTSB.</b>	
		3	Unit VII: Disaster Management Disaster rescue , Psychology of rescue, rescue workers, rescue plan, rescue by steps rescue equipment, Safeties in rescue operations, Debris clearance, Causality management	
		4	Revision of Unit 1 to Unit 3	
		5	Revision of Unit 4 to Unit 6	
5	December	1	Revision of Unit 7	

Note:- The Lesson Plan is tentative, subject to availaibility of time,students & faculty.

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(Er Tanmay Kapoor)

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**Planning of Syllabus Coverage  
Government Polytechnic SunderNagar**

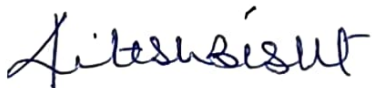
**Subject: PC&PSC Semester :5th Trade: Civil Engg.**

**With Effect From:12/08/24Total period Planned: =45**

S.No	Weeks	Topics To Be Covered
1	Week 1	Unit-I Precast concrete Elements Advantages and disadvantages of precast concrete members• Non-structural Precast elements-Paver blocks, Fencing Poles, Transmission• Poles, Manhole Covers, Hollow and Solid Blocks, kerb stones as per relevant BIS specification
2	Week 2	Structural Precast elements –tunnel linings, Canal lining, Box culvert, bridge• panels, foundation, sheet piles Unit-II Prefabricated building Precast Structural Building components such as slab panels, beams, columns,• footings, walls, lintels and chajjas, staircase elements,
3	Week 3	Prefabricated building using precast load bearing and non-load bearing wall• panels, floor systems-Material characteristics, Plans & Standard specifications
4	Week 4	Prefab systems and structural schemes and their classification• Joints– requirements of structural joints•
5	Week 5	Manufacturing, storage, curing, transportation and erection of above elements, equipment needed
6	Week 6	Unit-III Introduction to Pre-Stressed Concrete Principles of pre-stressed concrete and basic terminology. Applications, advantages and disadvantages of pre stressed concrete
7	Week 7	Materials used and their properties, Necessity of high-grade materials• Types of Pre-stressing steel-Wire, Cable, tendon, Merits-demerits and• applications
8	Week 8	Unit-IV Methods and systems of pre-stressing Methods of pre-stressing–Internal and External pre-stressing, Pre and Post• tensioning applications Systems for pre tensioning– process, applications, merits and demerits-Hoyer system
9	Week 9	Systems for post-tensioning – process, applications, merits and demerits –• Freyssinet system, Magnel Blaton system, Gifford Udall system
10	Week10	Loss of pre-stress occurring subsequently: losses due to shrinkage of concrete, creep of concrete, elastic shortening, and creep in steel, (Simple Numerical problems to determine loss of pre-stress) BIS recommendations for percentage loss in case of Pre and Post tensioning.
11	Week 11	Unit-V Analysis and design of pre-stressed rectangular beam section Basic assumptions in analysis of pre-stressed concrete beams. •
12	Week 12	Cable Profile in simply supported rectangular beam section concentric, eccentric• straight and parabolic



12	Week 13	HOUSE TEST
13	Week 14	Effect of cable profile on maximum stresses at mid span and at support.
14	Week 15	Numerical problems on determination of maximum stresses at mid spans with linear (con-centric and eccentric) cable profiles only.
15	Week 16	Simple steps involved in Design of simply supported rectangular beam section• (No numerical problems)
16	Week 17	REVISION

  
Er.Ritesh Bisht

  
(H.O.D Civil Engg.)

**DEPARTMENT OF CIVIL ENGINEERING  
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**LESSON PLAN FOR Design of RCC Structures Lab (SEMESTER-5TH)SESSION: (Aug-Dec 2024)**

S.No.	MONTH	WEEK	CONTENTS	REMARKS
1	August	Week 2	Rectangular beams – Singly reinforced	
		Week 3	Preparation & Checking of Drawing Sheet	
		Week 4	Rectangular beams- Doubly reinforced	
		Week 5	Preparation & Checking of Drawing Sheet	
2	September	Week 1	One-way slabs	
		Week 2	<b>Class Test -1 Will be held this week.</b>	
		Week 3	Preparation & Checking of Drawing Sheet	
		Week 4	Two-way slabs (Corner not held down)	
		Week 5	Preparation & Checking of Drawing Sheet	
3	October	Week 1	Square columns with isolated footing of uniform depth and varying depth (sloped footings)	
		Week 2	Preparation & Checking of Drawing Sheet	
		Week 3	Circular column with isolated footing of uniform depth and varying depth (sloped footings). <b>Class Test -2 Will be held this week.</b>	
		Week 4	Interpret the actual RCC Structural Drawings used on site with reference to reinforcement details of various structural elements.	
		Week 5	Prepare a detailed report of site visit for reinforcement detailing of structural elements like beams, columns, staircase & footing.	
4	November	Week 1	Prepare a checklist for reinforcement provided from actual drawings used on site for various structural elements.	
		Week 2	<b>House Test will be held this week</b>	
		Week 3	Preparation & Checking of Drawing Sheet	
		Week 4	Preparation & Checking of Drawing Sheet	
		Week 5	Revision of Previous Year Question Papers	
5	December	Week 1	Doubt Clearing Sessions & Discussion on Previous Years Question Papers	

Signature of Teacher

(Er. Ishan Sharma)

Er. Garima Sharma

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(Er Tanmay Kapoor)

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**LESSON PLAN FOR Computer Applications in Civil Engg.(G-I) (SEMESTER-5TH)SESSION: (Aug-Dec 2024)**

S.No.	MONTH	WEEK	CONTENTS	REMARKS
1	August	Week 2	Unit I: Introduction : Starting up of Auto CAD, Auto CAD Window.	
		Week 3	Toolbar, drop down menu, Command window, saving the drawing. Introduction of Graphic screen.	
		Week 4	Checking of Practical Files	
		Week 5	Unit II: Drawing, Editing, Dimensioning Commands :	
2	September	Week 1	Co-ordinates, drawing limits, grid, snap, orthographic features. Drawing commands, line, circle, poly-line, multiline, ellipse, polygon etc.	
		Week 2	Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc.	
		Week 3	Checking of Practical Files	
		Week 4	Working with hatches, fills, dimensioning, text etc	
		Week 5	Unit III: Submission/ Working Drawing : Drawing T, L, I, E, H with absolute, consecutive and polar coordinate system	
3	October	Week 1	Preparation of line plan of a residential building Preparation of detailed plan of a two-room residential building	
		Week 2	Practice on making plans .	
		Week 3	Checking of Practical Files	
		Week 4	Elevation, Section, Site Plan (using different type of layers) Introduction to STAAD Pro, (Expert may be invited to demonstrate) Introduction to MS Project/Primavera	
		Week 5	Checking of Practical Files	
4	November	Week 1	Unit IV: Use of artificial Intelligence in Building Design (Expert may be invited to demonstrate)	
		Week 2	Checking of Practical Files	
		Week 3	Checking of Practical Files	
		Week 4	Viva - Voce & Practice on Plans	
		Week 5	Practice on Detailed Plans of a two room residential building.	
5	December	Week 1	Practice on Detailed Plans of a two room residential building.	

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Signature of Teacher  
(Er Ishan Sharma)

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(Er Tanmay Kapoor)

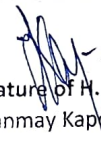
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**LESSON PLAN FOR Computer Applications in Civil Engg.(G-II) (SEMESTER-5TH)SESSION: (Aug-Dec 2024)**

S.No.	MONTH	WEEK	CONTENTS	REMARKS
1	August	Week 2	<b>Unit I: Introduction</b> : Starting up of Auto CAD, Auto CAD Window.	
		Week 3	Toolbar, drop down menu, Command window, saving the drawing. Introduction of Graphic screen.	
		Week 4	Checking of Practical Files	
		Week 5	<b>Unit II: Drawing, Editing, Dimensioning Commands</b> :	
2	September	Week 1	Co-ordinates, drawing limits, grid, snap, orthographic features. Drawing commands, line, circle, poly-line, multiline, ellipse, polygon etc.	
		Week 2	Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc.	
		Week 3	Checking of Practical Files	
		Week 4	Working with hatches, fills, dimensioning, text etc	
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4	November	Week 1	<b>Unit IV: Use of artificial Intelligence in Building Design (Expert may be invited to demonstrate)</b>	
		Week 2	Checking of Practical Files	
		Week 3	Checking of Practical Files	
		Week 4	Viva - Voce & Practice on Plans	
		Week 5	Practice on Detailed Plans of a two room residential building.	
5	December	Week 1	Practice on Detailed Plans of a two room residential building.	



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