

# BHAJ GURDAS INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

## LESSON PLAN

**Subject Name:** - Engineering Economics, Estimation & Costing  
**Year:** - 3<sup>rd</sup>

**Subject Code:** - BTCE-601-18  
**Semester:** - 6<sup>th</sup>

Lecture No.	Unit	Date/Week	Topic	Teaching Aids	Reference
L-1	<b>UNIT 1. BASIC PRINCIPLES OF ECONOMICS</b>	1 <sup>st</sup> week	Basic Macroeconomic Concepts	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-2			Aggregate demand and Supply (IS/LM),	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-3			Price Indices (WPI/CPI), Interest rates, Direct and Indirect Taxes.	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-4			Cost & Cost Control - Techniques, Types of Costs, Lifecycle costs	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-5	<b>UNIT-2: ELEMENTS OF BUSINESS/MANAGERIAL ECONOMICS</b>	2 <sup>nd</sup> week	Budgets, Break even Analysis, Capital Budgeting	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-6			Application of Linear Programming.	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-7			Investment Analysis – NPV, ROI, IR	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-8			Payback Period, Depreciation, Time value of money	White/Black Board & PPT	V. Mote, S. Paul, G. Gupta(2004), Managerial Economics, Tata McGraw Hill
L-9	<b>UNIT-3: ESTIMATION / MEASUREMENTS FOR VARIOUS ITEMS</b>	3 <sup>rd</sup> week	Introduction to the process of Estimation & Use of relevant Indian Standard Specifications for the same	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-10			Types of Estimation and their Numerical problems and comparison between different types of same	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation
L-11			Bar bending schedules, Mass haul Diagrams	White/Black Board & Group Discussion	M Chakravarty, Estimating, Costing Specifications & Valuation
L-12			Estimating Earthwork and Foundations, Estimating Concrete and Masonry, Finishes	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation

L-13		4 <sup>th</sup> week	Numerical Problems on Estimating earthwork and Foundations	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation
L-14	Introduction to Rate of Analysis & -Thumb rules for computation of materials requirement for different materials for buildings		White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-15	Percentage breakup of the cost, cost sensitive index, market survey of basic materials.		White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-16	Use of Computers in quantity surveying		White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-17	<b>UNIT-4: SPECIFICATION</b>	5 <sup>th</sup> week	Types, requirements and importance of Specifications	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation
L-18			Detailed Specifications for buildings, roads	White/Black Board & PPT & Group Discussion	M Chakravarty, Estimating, Costing Specifications & Valuation
L-19			Detailed Specifications for minor bridges and industrial structures	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-20	<b>UNIT-5: RATE ANALYSIS</b>	6 <sup>th</sup> week	Purpose, importance and necessity of the rate analysis	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-21			Numerical problem on rate of analysis	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-22			Factors affecting, task work, daily output from different equipment/ productivity.	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-23			Preparation of tender documents, importance of inviting tenders	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation
L-24	<b>UNIT-6: TENDER</b>	6 <sup>th</sup> week	Introduction to Contract	White/Black Board & PPT & Group Discussion	M Chakravarty, Estimating, Costing Specifications & Valuation
L-25			Different types of Contract and their conditions	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-26		7 <sup>th</sup> week	Relative merits, prequalification. general and special conditions in Contract	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-27			Termination of contracts	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-28			Extra work and Changes	White/Black	M Chakravarty, Estimating,

		8 <sup>th</sup> week	& penalty and liquidated charges	Board & PPT	Costing Specifications & Valuation	
L-29			Discussion on Settlement of disputes	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-30			Introduction on payment of advance, insurance, claims, price variation in tenders	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-31	<b>UNIT-7: INTRODUCTION TO ACTS</b>	9 <sup>th</sup> week	Introduction to Bids, Preparing Bids, Bid Price	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-32				Concept of Build-up: Material, Labour, Equipment costs, Risks, Direct & Indirect Overheads,	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-33				Concept of Bid Conditions and profits	White/Black Board	M Chakravarty, Estimating, Costing Specifications & Valuation
L-34		10 <sup>th</sup> week	Concept of alternative specifications and alternative Bids	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-35				Concept of Bid process management	White/Black Board & PPT & Group Discussion	M Chakravarty, Estimating, Costing Specifications & Valuation
L-36				Introduction to Acts in Estimating and Costing	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-37		11 <sup>th</sup> week	Acts pertaining to- Minimum wages	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-38				Detail description of Workman's compensation	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-39				Introduction and Types of Contracts	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation
L-40		12 <sup>th</sup> week	Types of Contracts	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-41			Concept of Arbitration, Easement rights.	White/Black Board & PPT & Group Discussion	M Chakravarty, Estimating, Costing Specifications & Valuation	
L-42			Concept of Easement Rights	White/Black Board & PPT	M Chakravarty, Estimating, Costing Specifications & Valuation	

# BHAJ GURDAS INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

## LESSON PLAN

**Subject Name:** - Foundation Engineering  
**Year:** - 3<sup>rd</sup>

**Subject Code:** - PECE-602A-18  
**Semester:** - 6<sup>th</sup>

Lecture No.	Unit	Date/Week	Topic	Teaching Aids	Reference
L-1	<b>UNIT 1: SOIL EXPLORATION &amp; STRESS DISTRIBUTION</b>	1 <sup>st</sup> week	Object of soil investigation for new and existing structures	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-2			Depth of exploration for different structures. Spacing of bore Holes.	White/Black Board & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-3			Methods of soil exploration and relative merits and demerits. Types of soil sample	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-4			Design features of sampler affecting sample disturbance.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-5		2 <sup>nd</sup> week	Essential features and application of the following types of samples- Open Drive samples, Stationery piston sampler, Rotary sampler	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-6			Standard penetration test - static and dynamic cone penetration test.	White/Black Board & PPT & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-7			Bore Hole log for S.P.T. Geophysical exploration by seismic and resistivity methods.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-8			Stresses Distribution: Bosussinesq equation for a point load, uniformly loaded circular and rectangular area	White/Black Board	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-9		2 <sup>nd</sup> week	Newmark's chart and its construction. 2:1 method of load distribution.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-10			Comparison of Bosussinesq and Westerguard analysis for a point load. Pressure Bulb and Isobar. Related	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy

		3 <sup>rd</sup> week	Numerical Problems		
L-11	<b>UNIT 2: EARTH PRESSURE</b>	3 <sup>rd</sup> week	Terms and symbols used for a retaining wall. Movement of all and the lateral earth pressure.	White/Black Board & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-12			Earth pressure at rest. Rankine states of plastic equilibrium, $K_a$ and $K_p$ for horizontal backfills	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-13		4 <sup>th</sup> week	Rankine's theory both for active and passive earth pressure for Cohesionless backfill with surcharge.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-14			Rankine's theory both for active and passive earth pressure for Cohesionless backfill with fully submerged case.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-15			Cohesive backfill condition. Coulomb's method for cohesion less backfill	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-16		5 <sup>th</sup> week	Merits and demerits of Ranking and Coulomb's theories	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-17			Culmann's graphical construction (without surcharge load).	White/Black Board	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-18	<b>UNIT 3: SHALLOW FOUNDATION</b>	5 <sup>th</sup> week	Type of shallow foundations, Depth and factors affecting it	White/Black Board & PPT & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-19		6 <sup>th</sup> week	Definition of ultimate bearing capacity, safe bearing capacity and allowable bearing capacity	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-20			Rankine's analysis and Terzaghi's analysis. Types of Shear failures.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-21			Factors affecting bearing capacity	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-22			B.I.S. recommendations for shape, depth and inclination factors	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-23			Plate Load test and standard penetration Test	White/Black Board	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj

L-24		7 <sup>th</sup> week	Causes of settlement of structures, Comparison of immediate and consolidation settlement	White/Black Board & PPT & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-25			Calculation of settlement by Plate load Test	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-26			Calculation of settlement by Static Cone penetration test data.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-27	<b>UNIT 4: PILE FOUNDATION &amp; WELL FOUNDATION</b>	8 <sup>th</sup> week	Allowable settlement of various structures according to I.S. Code.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-28			Types and function of pile, Factors influencing the selection of pile	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-29			carrying capacity of single pile in cohesion less and cohesive soil by static formula	White/Black Board	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-30			Determination of point resistance and frictional resistance of a single pile by Static formulas	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-31		9 <sup>th</sup> week	Piles in Clay, Safe load on a Friction and point Bearing pile- dynamic formulae (Engineering News and Hileys)	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-32			Types of pile driving hammers & their comparison. Limitations of pile driving formulae	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-33			Negative skin friction - Carrying capacity of Pile group - Pile load test Cyclic Pile Load Test	White/Black Board	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-34		10 <sup>th</sup> week	Separation of skin friction and point resistance using cyclic pile load test.	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-35			Pile in sand, Spacing of piles in a group, Factors affecting capacity of a pile group	White/Black Board & PPT & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-36			Efficiency of pile group by converse – Labare formula and feeds formulas	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta

L-37		11 <sup>th</sup> week	Bearing capacity of a pile group in clay by block failure and individual action approach	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-38			Calculation of settlement of friction pile group in clay	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-39			Settlement of pile groups in sand, Negative skin friction. Related Numerical problems	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-40			Well foundations -shapes, depth of well foundations	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-41		12 <sup>th</sup> week	Components & factors affecting well foundation design	White/Black Board & PPT & Group Discussion	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj
L-42			Scour Depth, construction procedure,	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering by Gulati and Datta
L-43			sinking of wells, rectification of tilts and shifts,	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Soil Mech. & Foundation Engg., by V.N.S.Murthy
L-44			Recommended values of tilts & shifts as per I.S.3955. Related Numerical problems	White/Black Board & PPT	Soil Mech. & Foundation Engg, by K.R.Arora Geotechnical Engineering, by P. Purshotama Raj

# BHAJ GURDAS INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

## LESSON PLAN

**Subject Name:** - Structural Analysis and Design  
**Year:** - 3<sup>rd</sup>

**Subject Code:** - PECE-603D-18  
**Semester:** - 6<sup>th</sup>

Lecture No.	Unit	Date/Week	Topic	Teaching Aids	Reference
L-1	<b>UNIT-I: REVIEW OF INDETERMINACY</b>	1 <sup>st</sup> week	Static indeterminacies of beams and rigid -jointed plane frames.	White/Black Board & PPT	Basic structural analysis - C.S. Reddy
L-2			Static indeterminacies of pin-jointed plane frames.	White/Black Board	Basic structural analysis - C.S. Reddy
L-3			Kinematic indeterminacies of beams and rigid-jointed plane frames	White/Black Board & PPT	Basic structural analysis - C.S. Reddy
L-4			Kinematic indeterminacies of pin-jointed plane frames.	White/Black Board & PPT	Basic structural analysis - C.S. Reddy
L-5			Static and kinematic indeterminacies – Numerical Problems	White/Black Board	Basic structural analysis - C.S. Reddy
L-6	<b>UNIT-II: ANALYSIS OF INDETERMINATE STRUCTURES</b>	2 <sup>nd</sup> week	Analysis indeterminate beams by Kani's method - Concept	White/Black Board & PPT	Intermediate structural analysis – C.K. Wang, Structural analysis - S Ramamurtham
L-7			Analysis indeterminate beams by Kani's method – Numerical Problems	White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis - S Ramamurtham
L-8			Analysis indeterminate beams by Kani's method – Numerical Problems	White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis
L-9		3 <sup>rd</sup> week	Indeterminate frames – Analysis by Kani's method - Concept	White/Black Board & PPT	Intermediate structural analysis – C.K. Wang, Structural analysis
L-10			Indeterminate frames – Analysis by Kani's method – Numerical Problems	White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis
L-11	Indeterminate frames – Analysis by Kani's method – Numerical Problems		White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis	
L-12	Theorem of three moments, Portal method		White/Black Board & PPT	Intermediate structural analysis – C.K. Wang, Structural analysis	
L-13		4 <sup>th</sup> week	Cantilever method	White/Black Board & PPT	Intermediate structural analysis – C.K. Wang, Structural analysis

L-14			Portal and Cantilever method - Numerical Problems	White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis
L-15			Substitute frame method - Concept	White/Black Board & PPT	Intermediate structural analysis – C.K. Wang, Structural analysis
L-16			Substitute frame method – Numerical Problems	White/Black Board	Intermediate structural analysis – C.K. Wang, Structural analysis - S Ramamurtham
L-17	<b>UNIT-III: MOVING LOADS AND INFLUENCE LINES</b>	5 <sup>th</sup> week	Analysis of moving Loads for determinate beams	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-18			Influence lines for indeterminate beams - Concept	White/Black Board & PPT	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-19			Influence lines for indeterminate beams – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-20			Influence lines for indeterminate beams – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-21		6 <sup>th</sup> week	Influence lines for indeterminate trusses - Concept	White/Black Board & PPT	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-22			Influence lines for indeterminate trusses – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-23			Influence lines for indeterminate trusses – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-24			Influence lines for indeterminate frames - Concept	White/Black Board & PPT	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-25		7 <sup>th</sup> week	Influence lines for indeterminate frames – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-26			Influence lines for indeterminate frames – Numerical Problems	White/Black Board	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy
L-27	Muller Breslau principle		White/Black Board & PPT	Structural analysis - S Ramamurtham, Basic structural analysis - C.S. Reddy	

L-28	<b>UNIT-IV: DESIGN OF CONCRETE STRUCTURES</b>		Columns with moments: Design of short columns with uni-axial bending	White/Black Board & PPT	Limit state Design of Reinforced Concrete - P.C. Varghese, Design of concrete structures – B.C. Punmia	
L-29		8 <sup>th</sup> week	Columns with moments: Design of short columns with bi-axial bending	White/Black Board	Limit state Design of Reinforced Concrete - P.C. Varghese, Design of concrete structures – B.C. Punmia	
L-30			Design of Long columns, use of design charts	White/Black Board & PPT	Limit state Design of Reinforced Concrete - P.C. Varghese, Design of concrete structures – B.C. Punmia	
L-31			Design of columns - Problems	White/Black Board	Limit state Design of Reinforced Concrete - P.C. Varghese, Design of concrete structures – B.C. Punmia	
L-32			Foundations: Isolated footing for columns	White/Black Board & PPT	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-33			Foundations: Combined footing for columns	White/Black Board	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-34		9 <sup>th</sup> week	Foundations – Numerical Problems	White/Black Board	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-35			Staircases, Introduction, types and design procedure	White/Black Board & PPT	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-36			Staircases, Introduction, types and design problems	White/Black Board	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-37			10 <sup>th</sup> week	Retaining walls - Cantilever type retaining wall.	White/Black Board & PPT	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia
L-38		Retaining walls - Counter-forte type retaining wall.		White/Black Board & PPT	Design of reinforced concrete structures - S Ramamrutham, Design of concrete structures – B.C. Punmia	
L-39		<b>UNIT-V: DESIGN OF STEEL STRUCTURES</b>	10 <sup>th</sup> week	Column bases: Slab base	White/Black Board & PPT	Limit state design of steel structures - S K Duggal, Design of steel structures - N Subramanian
L-40				Column bases: Gusseted base	White/Black Board & PPT	Limit state design of steel structures - S K Duggal, Design of steel structures - N Subramanian
L-41				Beam-column connections: bracket connections	White/Black Board & PPT	Limit state design of steel structures - S K Duggal,

					Design of steel structures - N Subramanian
L-42		11 <sup>th</sup> week	Beam-column connections: seated connections.	White/Black Board & PPT	Limit state design of steel structures - S K Duggal, Design of steel structures - N Subramanian
L-43	Beam-column connections: framed connections.		White/Black Board & PPT	Limit state design of steel structures - S K Duggal, Design of steel structures - N Subramanian	
L-44	Plate girders: Elements of a plate girder		White/Black Board & PPT	Design of steel structures (by limit state method – S.S. Bhavikatti, Design of steel structures - N Subramanian	
L-45		12 <sup>th</sup> week	Design of plate girder section	White/Black Board & PPT	Design of steel structures (by limit state method – S.S. Bhavikatti, Design of steel structures - N Subramanian
L-46			Intermediate and bearing stiffeners	White/Black Board & PPT	Design of steel structures (by limit state method – S.S. Bhavikatti, Design of steel structures - N Subramanian
L-47			Roof trusses: Types, Design loads	White/Black Board & PPT	Design of steel structures (by limit state method – S.S. Bhavikatti, Design of steel structures - N Subramanian
L-48			Roof trusses: Design of members and joints	White/Black Board & PPT	Design of steel structures (by limit state method – S.S. Bhavikatti, Design of steel structures - N Subramanian

# BHAI GURDAS INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering

## LESSON PLAN

**Subject Name:** - Sustainable Construction Methods

**Subject Code:** - PECE-604B-18

**Year:** - 3<sup>rd</sup>

**Semester:** - 6<sup>th</sup>

Lecture No.	Unit	Date/Week	Topic	Teaching Aids	Reference	
L-1	<b>UNIT 1: INTRODUCTION</b>	1 <sup>st</sup> week	Definitions- Various types - Pillars of Sustainability - Circle of Sustainability	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-2			Need - systems and their sustainability - Green Buildings -Difference between Green and Sustainability	White/Black Board & PPT & Group Discussion	Sustainability Principles and Practice by Margaret Robertson	
L-3			Climate Change, Global warming - National and International policies and Regulations	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Climate Change & Sustainable Development by Gursharan Singh	
L-4		2 <sup>nd</sup> week	Identification of cutting edge sustainable construction materials, technologies	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-5			Project management strategies for use in the construction industry	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-6			Evaluation of strategies potential to reduce the negative environmental impacts of construction activity.	White/Black Board & PPT & Group Discussion	Sustainability Principles and Practice by Margaret Robertson Sustainability: A Systems Approach by Tony Clayton	
L-7		<b>UNIT 2: BUILDING CONSTRUCTION METHODS</b>	3 <sup>rd</sup> week	Conventional vs modular construction methods, development , Engineering principles, benefits	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-8				Modular construction methods for repetitive works	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-9			Methods, development , Engineering principles, benefits	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-10			4 <sup>th</sup>	Green Roofs, Cool Roofs, Passive House, Rammed Earth Brick, Passive	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson

		week	Solar			
L-11			Greywater Plumbing Systems, Solar Thermal Cladding, Solar Power	White/Black Board & PPT & Group Discussion	Sustainability Principles and Practice by Margaret Robertson	
L-12			Water Efficiency Technologies, Sustainable Indoor Environment Technologies	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Sustainability: A Systems Approach by Tony Clayton	
L-13	<b>UNIT 3: PRECAST CONSTRUCTION METHODS</b>	5 <sup>th</sup> week	Modular construction methods for repetitive works	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-14			Precast concrete construction methods; Benefits, Sustainability in Concrete Mix Design	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-15			Greener, Faster and Sustainable Construction Practices Through Precast Solutions	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-16		6 <sup>th</sup> week	Use of secondary cementitious material (SCM's) like GGBS, fly ash	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-17			Ultra-fine GGBS in the production of the concrete,	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-18			Basics of Slip forming for tall structures	White/Black Board & PPT & Group Discussion	Sustainability Principles and Practice by Margaret Robertson	
L-19		7 <sup>th</sup> week	Structural 3D Printing, Self-healing Concrete, Green Insulation,	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-20			Sustainable Resource Sourcing, Environmental Sustainability Benefits From Precast Concrete.	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-21		<b>UNIT 4: CONSTRUCTION METHODS OF BRIDGES</b>	8 <sup>th</sup> week	Types of foundations and construction methods	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Sustainability: A Systems Approach by Tony Clayton
L-22				Basics of Formwork and Staging; Proactive Maintenance	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-23	Prefabrication/Modular Construction, balance between environment and construction activities		White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson		
L-24	Reducing problems at site with minimal staging, increasing safety etc		White/Black Board & PPT & Group	Sustainability Principles and Practice by Margaret Robertson		

		9 <sup>th</sup> week		Discussion	
L-25			Constructions are sustainable with reduced use of natural resources	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Sustainability: A Systems Approach by Tony Clayton
L-26			Costs of Construction/Assembly and Transportation, Lifespan, Environmental Impact	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-27		10 <sup>th</sup> week	Harmful emissions during bridge construction	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-28	Reducing waste, solar panels to power LED lights to illuminate its deck		White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-29	Water-powered light system powered by the currents of the river		White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-30	Development that meets the needs of the present.		White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson	
L-31	<b>UNIT 5: NEW CONSTRUCTION MATERIALS TECHNOLOGIES</b>	11 <sup>th</sup> week	Introduction to new construction materials & technologies	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Sustainability: A Systems Approach by Tony Clayton
L-32			Synthetic Roof Underlayment, Electro chromic Glass	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-33			Biodegradable Materials,	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-34			Reduction of water consumption, Impact on environment	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-35		12 <sup>th</sup> week	Green Engineering concepts, Sustainable Urbanization, industrialization	White/Black Board & PPT & Group Discussion	Sustainability Principles and Practice by Margaret Robertson
L-36			Industrial Processes: Material selection, Pollution Prevention	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson
L-37			Concepts of climate responsive building & their case studies	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson Climate Change & Sustainable Development by Gursharan Singh
L-38			Sustainability assessment using standard approaches- LEED/GRIHA rating evaluation process	White/Black Board & PPT	Sustainability Principles and Practice by Margaret Robertson