

Name of the Faculty : DHEERAJ SAHNI
Discipline : Civil Engineering
Semester : 5th
Subject : REPAIR & MAINTENANCE OF BUILDINGS
Lesson Plan Duration : 15 Weeks [15.9.2022 to onwards]

Week	Theory	
	Lecture Day	Topic (including assignment / test)
1 st	1	1.1 Importance and significance of repair and maintenance of buildings
	2	1.2 Meaning of maintenance 1.3 Objectives of maintenance
	3	1.4 Factors influencing the repair and maintenance
2 nd	1	2.1 Definition of deterioration/decay
	2	2.2 Factors causing deterioration, their classification 2.2.1 Human factors causing deterioration
	3	2.2.2 Chemical factors causing deterioration 2.2.3 Environmental conditions causing deterioration
3 rd	1	2.2.4 Miscellaneous factors 2.3 Effects of various agencies of deterioration on various building materials i.e. bricks, timber, concrete, paints, metals, plastics, stones
	2	3. Investigation and Diagnosis of Defects 3.1 Systematic approach/procedure of investigation
	3	Class test/ Assignment I
4 th	1	3.2 Sequence of detailed steps for diagnosis of building defects/problems
	2	3.3 List non-destructive and others tests on structural elements
	3	Materials to evaluate the condition of the building and study of three most commonly used tests
5 th	1	Revision
	2	1st Sessional Test
6 th	1	4. Defects and their root causes (06 hrs) 4.1 Define defects in buildings 4.2 Classification of defects
	2	4.3 Main causes of building defects in various building elements 4.3.1 Foundations, basements and DPC 4.3.2 Walls
	3	4.3.3 Column and Beams 4.3.4 Roof and Terraces
7 th	1	4.3.5 Joinery 4.3.6 Decorative and protective finishes
	2	4.3.7 Services 4.3.8 Defects caused by dampness
	3	5. Materials for Repair, maintenance and protection. 5.1 Compatibility aspects of repair materials
8 th	1	5.2 State application of following materials in repairs 5.2.1 Anti corrosion coatings
	2	
	3	5.2.2 Adhesives/bonding aids 5.2.3 Repair mortars

9 th	1	Class Test/Assignment-II
	2	5.2.4 Curing compounds 5.2.5 Joints sealants:
	3	5.2.6 Waterproofing systems for roofs
10 th	1	5.2.7 Protective coatings
	2	Revision
	3	2nd Sessional exam
11 th	1	6. Remedial Measures for Building Defects 6.1 Preventive maintenance considerations
	2	6.2 Surface preparation techniques for repair 6.3 Crack repair methods 6.3.1 Epoxy injection 6.3.2 Grooving and sealing
	3	6.3.3 Stitching 6.3.4 Adding reinforcement and grouting 6.3.5 Flexible sealing by sealant
12 th	1	6.4 Repair of surface defects of concrete 6.4.1 Bug holes 6.4.2 Form tie holes 6.4.3 Honey comb and larger voids
	2	6.5 Repair of corrosion in RCC elements 6.5.1 Steps in repairing 6.5.2 Prevention of corrosion in reinforcement
	3	6.6 Material placement techniques with sketches 6.6.1 Pneumatically applied (The gunite techniques) 6.6.2 Open top placement 6.6.3 Pouring from the top to repair bottom face
13 th	1	6.6.4 Birds mouth 6.6.5 Dry packing 6.6.6 Form and pump 6.6.7 Preplaced – aggregate concrete 6.6.8 Trowel applied method
	2	6.7 Repair of DPC against Rising 6.7.1 Physical methods 6.7.2 Electrical methods 6.7.3 Chemical methods
	3	Class test /Assignment III
14 th	1	6.8 Repair of walls 6.8.1 Repair of mortar joints against leakage 6.8.2 Efflorescence removal
	2	6.9 Waterproofing of wet areas and roofs 6.9.1 Water proofing of wet areas 6.9.2 Water proofing of flat RCC roofs 6.9.3 Various water proofing systems and their characteristics
	3	6.10 Repair of joints in buildings 6.10.1 Types of sealing joints with different types of sealants
15 th	1	6.10.2 Techniques for repair of joints 6.10.3 Repair of overhead and underground water tanks
	2	Revision
	3	Test/Assignment III

Name of the Faculty : **PREETI DHAMI**
Discipline : **Civil Engg.**
Semester : **5thSemester**
Subject : **HIGHWAY ENGG**
Lesson Plan Duration : **15 weeks [15.9.2022 to onwards]**

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
1.	1.	1. Introduction (02 hrs) 1.1 Importance of Highway engineering 1.2 Functions of IRC, CRRI, MORT&H, NHAH	1.	Brief Introduction to Practical's
	2.	1.3 IRC classification of roads		
	3.	-----DO-----		
	4	2. Road Geometrics (10 hrs) Glossary of terms used in road geo- metrics and their importance: Right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation levels, camber and gradient		
2.	1.	-----Do----- -----	2.	1. Determination of penetration value of bitumen
	2.	2.2 Average running speed, stopping and passing sight distance		
	3.	2.3 Necessity of curves, horizontal and vertical curves including transition curves. Super elevation and methods of providing super elevation		
	4	2.4 Sketch of typical cross-sections in cutting and filling on straight alignment and at a curve		

3.	1.	3. Highway Surveys and Plan 3.1 Topographic map, reading the data given on a topographic map	3.	2. Determination of softening point of bitumen
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	2.	-----DO-----	
	3.	3.2 Basic considerations governing alignment for a road in plain and hilly area	
	4.	Class test/ Assignment I	
4.	1.	3.3 Highway location; marking Of alignment DO	4. 3. Determination of ductility of bitumen
	2.	4. Road Materials 4.1 Different types of road materials in use; soil, aggregate,	
	3.	binders – bitumen, cutback, Emulsion and Modified Bitumen (CRMB, PMB)	
	4.	4.2 Binders: Common binders; bitumen, properties as per BIS specifications, penetration,	
5.	1.	softening point, ductility and viscosity test of bitumen, procedures and significance,	5. Revision
	2.	cut back and emulsion and their uses, Bitumen modifiers	
	3.	Revision	
	4	1st Sessional Test	
6.	1.	5. Road Pavements 5.1 Road pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components	6. 4. Determination of impact value of the road aggregate

	2.	5.2. Introduction to California Bearing Ratio, method of finding CBR value and its significance. Aggregate : Source and types, important properties, strength, durability		
	3.	5.3 Sub-grade preparation: Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profiles of embankment, construction of embankment, compaction, preparation of subgrade		
	4	Methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation. Stabilization of subgrade. Types of stabilization mechanical stabilization, lime stabilization, cement stabilization, fly ash stabilization etc.(introduction only)		
7.	1.	5.4 Introduction to Sub Base Course and Base Course: a) Granular base course: (i) Water Bound Macadam (WBM) (ii) Wet Mix Macadam (WMM)	7.	5. Determination of abrasion value (Los Angeles') of road aggregate
	2.	b) Bitumen Courses: (i) Bituminous Macadam (ii) Dense Bituminous Macadam (DBM) c) *Methods of construction as per MORT&H		
	3.	5.5 Surfacing: a) * Types of surfacing i) Prime coat and tack coat ii) Surface dressing with seal coat iii) Open graded premix carpet iv) Mix seal surfacing v) Semidense bituminous concrete		
	4	vi) Bituminous Concrete/Asphaltic concrete vii) Mastic Asphalt		
	5	b) Methods of constructions as per MORT&H specifications and quality		

		control..		
8.	1.	5.6 Rigid Pavements: Construction of concrete roads as per IRC specifications: Form work laying, mixing and placing the concrete, compacting and finishing, curing, joints in concrete pavement, equipment used	8.	6. Determination of the California bearing ratio (CBR) for the sub-grade soil
	2.	6. Hill Roads: Introduction: 6.1 Typical cross-sections showing all details of a typical hill road, partly in cutting and partly in filling		
	3.	6.2 Special problems of hill areas 6.2.1 Landslides: Causes, prevention and control measures, use of geogrids, geoflexiles, geo-Synthetics 6.2.2 Drainage 6.2.3 Soil erosion		
	4	Class Test/ Assignment II		
9.	1.	6.2.4 Snow: Snow clearance, snow avalanches, frost Land Subsidence	9.	7. Visit to Hot mix plant
	2.	7. Road Drainage: 7.1 Necessity of road drainage work, cross drainage works		
	3.	7.2 Surface and subsurface drains and storm water drains. Location,		
	4	Spacing and typical details of side drains, side ditches for surface drainage. Intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections		

10.	1.	Revision	10.	
	2.	2nd Sessional Test		
11.	1.	8. Road Maintenance: (06 hrs) 8.1 Common types of road failures of flexible pavements: Pot hole, rutting, alligator cracking, upheaval - their causes and remedies (brief description)	11.	8. Visit to highway construction site for demonstration of operation of: Tipper, tractors (wheel and crawler), scraper, bulldozer, dumpers, shovels, grader, roller, dragline, road pavers, JCB etc.
	2.	-----Do-----		
	3	8.2 Maintenance of bituminous road such as seal-coat, patch-work and recarpetng.		
	4	8.3 Maintenance of concrete roads- filling cracks, repairing joints		
12.	1.	-----Do-----	12.	9. Mixing and spraying equipment
	2.	Maintenance of shoulders (berms), maintenance of traffic control devices		
	3.	9. Road Construction Equipment: Output and use of the following plant and equipment		
	4	-----Do-----		

13.	1.	9.1 Hot mix plant	13.	10 A compulsory visit to Ready Mix Concrete plant.
	2.	9.2 Tipper, tractors (wheel and crawler) scraper		
	3.	Bulldozer, dumpers, shovels, grader, roller, dragline		
	4.	9.3 Asphalt mixer and tar boilers 9.4 Road pavers		
14.	1.	Class Test/Assignment III	14.	REVISION
	2.	10. Airport Engineering :- 10.1 Necessity of study of airport engineering, aviation transport scenario in India		
	3.	10.2 Factors to be considered while selecting a site for an airport with respect to zoning laws.		
	4	10.3 Introduction to runways,		
	5	Taxiways and Apron		
15.	1.	REVISION	15.	REVISION
	2.	REVISION		
	3.	THIRD SESSIONAL		
	4.	PREPARATION FOR FINAL EXAM		

Name of the Faculty : M.P.SINGH
Discipline : Civil Engineering
Semester : 5th
Subject : RAILWAYS, BRIDGES AND TUNNELS
Lesson Plan Duration : 15 Weeks [15.9.2022 to onwards]

Week	Theory	
	Lecture Day	Topic (including assignment / test)
1 st	1	Introduction to the Subject and its necessity
	2	1. Introduction to Indian Railways
	3	2. Railway surveys: Factors influencing the railways route
	4	brief description of various types of railway survey
	5	3. Classification of permanent way describing its component parts
2 nd	1	4. Rail Gauge: Definition, types, practice in India
	2	5. Rails – types of rails
	3	Revision/Quarries
	4	6. Rail Fastenings: Rail joints, types of rail joints,
	5	fastenings for rails,
3 rd	1	fish plates, bearing plates
	2	7. Sleepers: Functions of sleepers, types of sleepers,
	3	Requirements of an ideal material for sleepers.
	4	8. Ballast: Function of ballast,
	5	Requirements of an ideal material for ballast
4 th	1	Revision/Assignment I
	2	9. Crossings and signallings: Brief description regarding different types of crossings/signallings
	3	Crossings and signallings: Brief description regarding different types of crossings (Latest electronics operated signal devices)
	4	Crossings and signallings: Brief description regarding different types of signallings (Latest electronics operated signal devices)
	5	10. Maintenance of track: Necessity, maintenance of track,
5 th	1	inspection of soil,
	2	Track
	3	Fixtures
	4	Test -I
	5	maintenance and boxing of ballast maintenance gauges, tools
6 th	1	11. Earth work and drainage: Features of rail road, bed level,
	2	width of formation, side slopes,
	3	Drains: methods of construction,
	4	requirement of drainage system
	5	12 Station and yards: purpose and types of stations and yards

		<p>13. Introduction</p>
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Bridge – its function and component parts, difference between a bridge

		and a culvert
7 th	1	14. Classification of Bridges Their structural elements and suitability: 14.1 According to life-permanent and temporary
	2	14.2 According to deck level – Deck, through and semi-through
	3	14.3 According to material –timber, masonry,
	4	steel, RCC, pre-stressed
	5	DO
8 th	1	14.4 According to structural form; - Grade separators-Railway Over-bridges (ROB), Railway under-bridge (RUB)
	2	- Beam type –RCC, T-Beam,
	3	steel girder bridges,
	4	plate girder and box girder,
	5	balanced cantilever,
9 th	1	Trussed bridges.
	2	- Arch type – open spandrel and filled spandrel barrel and rib type
	3	- Suspension type – unstiffened and stiffened and table (its description with sketches)
	4	DO
	5	- According to the position of highest flood level submersible and non-submersible
10 th	1	14.5 IRC classification
	2	15. Bridge Foundations: Introduction to open foundation,
	3	pile foundation,
	4	Well foundation
	5	16. Piers, Abutments and Wing-walls: 16.1 Piers-definition, parts; types –solid (masonry and RCC), open
11 th	1	Revision/Assignment-II
	2	Test -II
	3	16.2 Abutments and wing walls – definition, types of abutments (straight and tee),
	4	abutment with wing walls (straight and splayed)
	5	abutment with wing walls (return and curved)
12 th	1	DO
	2	Revision
	3	17. Bridge bearings Purpose of bearings;
	4	types of bearings – fixed plate,
	5	types of bearings –rocker and roller, Elastomeric bearing
13 th	1	Revision
	2	18. Maintenance of Bridges 18.1 Inspection of bridges
	3	18.2 Routine maintenance
	4	19. Definition and necessity of tunnels
	5	20. Typical section of tunnels for a national highway
14 th	1	Typical section of tunnels for a national highway and single and double broad gauge railway track
	2	DO

	3	21. Ventilation –necessity
	4	Methods of ventilation: Blowing and Exhaust
	5	combination of blowing and exhaust
15 th	1	22. Drainage method of draining water in tunnels
	2	Drainage method of draining water in tunnels
	3	23. Lighting of tunnels
	4	Assignment-III
	5	Test -III

Name of the Faculty : KULDEEP SINGH
Discipline : Civil Engg.
Semester : 5th Sem.
Subject : Reinforced Concrete Design
Lesson Plan
Duration : 15 weeks

Week	Theory		Practical Day	Topics
	Lecture Day	Topic (including assignment / test)		
1.	1	1.Introduction 1.1 Concept of Reinforced Cement Concrete (RCC) 1.2 Reinforcement Materials: Suitability of steel as reinforcing material Properties of mild steel and HYSD steel	1.	Introduction and importance of RCC drawing.
	2.	-----Do-----		
	3.	1.3.Loading on structures as per IS: 875		
	4.	2.Introduction to following methods of RCC design 2.1 Working stress method: Definition and basic assumptions		
	5.	-----Do-----		
2.	1.	2.2 Limit state method: Definition and basic assumptions	2.	1. Drawing No. 1: RC Slabs - One way slab
	2.	3.Shear and Development Length Shear as per IS:456-2000 by working stress method i)Shear strength of concrete without shear reinforcement		
	3.	ii)Maximum shear stress iii]Shear reinforcement		

	4.	-----Do-----		
	5.			
3.	1.	4. Concept of Limit State Method 4.1. Definitions and assumptions made in limit state of collapse (flexure)	3.	1. Drawing No. 1: Two way slab
	2.	4.2. Partial factor of safety for materials 4.3. Partial factor of safety for loads		
	3.	4.4. Design loads 4.5. Stress block, parameters		
	4.	Revision		
	5.	Class Test /Assignment I		
4.	1.	5. Singly Reinforced beam : Theory and design of singly reinforced beam by Limit State Method	4.	1. Drawing No. 1: Cantilever Slab.
	2.	-----DO---		
	3.	Numerical problems		
5.	1.	Revision	5.	Revision
	2.	Revision		
	3.	First Sessional		
6.	1.	6. Doubly Reinforced Beams: Theory and design of simply supported doubly reinforced rectangular beam by Limit State Method	6.	Drawing No.2 : Beams - Singly and doubly reinforced rectangular beams
	2.	-----Do-----		
	3.	-----Do-----		
	4.	-----Do-----		
	5.	-----Do-----		
7.	1.	One Way Slab Theory and design of simply supported one way slab including sketches showing reinforcement details (plan and section) by Limit State Method..	7.	Drawing No.2 : Cantilever beam (All beams with vertical stirrups)
	2.	-----Do-----		
	3.	-----Do-----		
8.	1.	Class Test/Assignment II	8.	Drawing No.3 : Columns and Footings – Square, Rectangular and
	2.	7. Behaviour of T beam, inverted T beam, isolated T beam and ‘L’ beams (No		

		Numericals)		Circular Columns with lateral ties and their isolated sloped column footings.
	3.	-----Do-----		
	4.	Revision		
9.	1.	8. One Way Slab: Theory and design of simply supported one way slab including sketches showing reinforcement details (plan and section) by Limit State Method..	9.	Drawing No.3 : Columns and Footings – Square, Rectangular and Circular Columns with lateral ties and their isolated sloped column
	2.	-----Do-----		
	3.	-----Do-----		
10.	1.	Numerical practice	10.	Revision
	2.	Revision		
	3.	Second Sessional		
11.	1.	9. Two Way Slab: Theory and design of two-way simply supported slab with corners free to lift, no provisions for torsional reinforcement by Limit State Method including sketches showing reinforcement details (plan and two sections)	11.	Drawing No. 4 : Portal Frame – Three bay two storey RC portal frame with blowup of column beam junctions.
	2.	-----Do-----		
	3.	-----Do-----		
12.	1.	10. Axially Loaded Column 10.1 Definition and classification of columns 10.2. Effective length of column,	12.	-----Do-----
	2.	10.3. Specifications for longitudinal and lateral reinforcement		
	3.	-----Do-----		
	4.	-----Do-----		
	5.	-----Do-----		
13.	1.	10.4. Design of axially loaded square, rectangular and circular short columns by Limit State Method including sketching of reinforcement (sectional elevation and plan)	13.	Drawing No. 5 : Draw at least one sheet using

				AutoCAD software
	2.	-----Do-----		
	3.			
		-----Do-----		
	4.	Numerical Practice		
	5.	Class Test/Assignment III		
14.		11Pre-stressed Concrete	14.	Revision
	1.	11.1 Concept of pre-stressed concrete		
	2.	11.2 Methods of pre-stressing : pre-tensioning and post-tensioning		
	3.	11.3 Advantages and disadvantages of pre-stressing 11.4 Losses in pre-stress		
	4.	-----Do-----		
	5.	Full Syllabus Test		
15.	1.	Revision	15.	Revision
	2.	Revision		
		Third Sessional		

Name of the Faculty : **KRISHAN KUMAR**
Discipline : **Civil Engineering**
Semester : **5th**
Subject : **PLUMBING SERVICES**
Lesson Plan Duration : **15 Weeks**

Week	Theory		Practicals	
	Lecture Day	Topic(including assignment / test)	Practical Day	Topics
1 st	1	Plumber's Tools Selection, use and care of tools required for plumbing work	1.	1. Carry out simple job requiring cutting mild steel plate, filing, drilling and tapping holes etc.
	2	Threading die, bit brace, ratchet brace		
	3	Pipe wrench, spanner set, pipe cutter, pipe vice		
2 nd	1	Hacksaw, chisel, files and other common hand tools	2.	2. Practice cutting, threading and bending of metal pipes; cutting and shaping of PVC pipes
	2	Benchdrilling machine, soldering iron		
	3	Revision		
3 rd	1	Pipes and Pipe Fitting Selection and use of different pipes like GI Pipes	3.	3. Carry out simple pipe connections requiring use of bends, tees, elbows etc.
	2	Plastic pipes, PVC pipes, HDPE pipes, Cast iron pipes.		
	3	Class test/ Assignment I		
4 th	1	Plumbing symbols; Bends, Elbows, Sockets, Tees, Unions.	4.	4. Erect simple water supply system
	2	Pipe cutting, Pipe bending, Pipe Threading, Pipe joints, Pipe fitting		
	3	Alignment of pipes, Branching of pipes, Safety precautions		
5 th	1	Revision		

6th	2	1st Sessional Test	5.	Revision
	1	Water Supply System Sources of water; Rainwater harvesting; Water supply systems in a town	6.	5. Test drainage lines by using different testing methods
	2	Water distribution systems.		
	3	Distribution reservoirs; Pumps.		
7th	1	Valves; Fire hydrants; Storage of water in buildings	7.	5. Practice fixing of different valves
	2	Types of tanks; Laying water supply pipe lines		
	3	Revision		
8th	1	Domestic Drainage Drainage system (two pipe, one pipe, single stack and other systems)	8.	Revision
	2	Trap, Cesspool, Sceptic tank.		
	3	Cleaning blocked pipes and drains, Laying sanitary and sewer pipes.		
9th	1	Class Test/Assignment-II	9.	Revision
	2	Manholes, Inspection and testing (pressure & leakage test, testing straightness of pipes)		
	3	Fixing accessories, Problems in drainage and their solution		
10 th	1	-----Do-----	10.	Revision
	2	Revision		
	3	2nd Sessional exam		
11 th	1	Sanitary Appliances Flush toilet	11.	6. Install sanitary fittings like washbasin, Sink, Floor traps, Urinal, Bathtub and heating appliance like geyser
	2	Squat toilet, Wash basin, Sink.		
	3	Floor traps, Urinal, Bathtub		
12 th	1	Shower, Bidet, Mixing tap, Popup waste	12.	

				Revision
	2	Revision		
	3	Revision		
13 th	1	Heating System Heat transfer	13.	Revision
	2	Water heater, Geyser		
	3	Class test /Assignment III		
14 th	1	Domestic hot water supply system	14.	Revision
	2	Central heating, Solar water heater.		
	3	Revision		
15 th	1	Full syllabus Test	15.	Revision
	2	Revision		
	3	Test/Assignment_III		