GOVERNMENT POLYTECHNIC, BOLANGIR

NAME OF THE FACULTY : Sri ANKIT BHINDE, Lecturer (STAGE-I,Civil Engineeri

Subject: CONCRETE TECHNOLOGY COURSE CODE- CEPC204

Program: Diploma in Civil Engineering
Semester: 6th sem syllabus
Total Contact Hours: 60 Total Marks: 100
Assessment: Internal Assessment – 20, End Term – 80

COURSE OBJECTIVE:
CO1: Describe functions and characteristics of concrete constituents.
CO2: Prescribe test requirements and methods for fresh and hardened concrete.
CO3: Design concrete mix.
CO4: Comprehend concrete production and inspection techniques.
CO5: Prepare and apply special concretes.
CO6: Identify deterioration mechanisms and adopt repair and durability improvement methods.

Hour	Topic	Subtopic	Teaching Aids/Activities	Objective
	UNIT-I Concrete as a Construction Material (02 Hours)	**2HRS**		
1	Introduction to Concrete	Concrete as construction material, grades of concrete	Charts, sample cubes, notes	CO1
2	Properties of Concrete	Advantages and disadvantages of concrete	Case discussion, worksheets	CO1
	UNIT–II : Cement (04 Hours)	**4HRS**		
3	Cement Composition	Composition of cement	Charts, cement samples	CO1
4	Hydration & Strength	Hydration of cement, water–cement ratio, compressive strength	Graph sheets, examples	CO1
5	Properties of Cement	Fineness, setting time, soundness	IS code extracts, samples	CO1

6	Types of Cement	Types of cement and applications	Comparison tables	CO1	
	UNIT-3 Aggregate, Water and Admixtures (06 Hours)	**6HRS**			
7	Aggregates	Classification & characteristics	Aggregate samples	CO1	
8	Grading	Fineness modulus, grading, IS 383	Sieve analysis sheets	CO1	
9	Water	Quality of water for mixing & curing	Case studies	CO1	
10	Admixtures	Functions & classification, IS 9103	Charts, samples	CO1	
11	Chemical Admixtures	Accelerating & retarding admixtures	Application sheets	CO1	
12	Special Admixtures	Water reducers & air entraining admixtures	Comparative charts	CO1	
	UNIT–IV : Properties of Fresh Concrete (06 Hours)	**6HRS**			
13	Fresh Concrete	Concept & workability	Charts, notes	CO2	
14	Slump Test	Procedure & interpretation	Slump cone demo	CO2	
15	Compacting Factor	Test & significance	Lab data sheets	CO2	
16	Vee-Bee Test	Consistency test	Videos / charts	CO2	
17	Flow Test	Flow table test	Test reports	CO2	

18	IS Requirements	Workability requirements, IS 1199	IS code extracts	CO2
	UNIT–V :Properties of Hardened Concrete (07 Hours)	**7 HRS**		
1	Strength Tests	Cube & cylinder compressive strength	Test reports	CO2
2	Flexural Strength	Modulus of rupture	Numerical sheets	CO2
3	Stress–Strain	Elasticity of concrete	Graphs	CO2
4	Time-Dependent Effects	Creep & shrinkage	Case examples	CO2
5	Durability	Permeability & durability	Charts	CO2
6	Chemical Attack	Sulphate, chloride & acid attack	Visual samples	CO2
7	Efflorescence	Causes & prevention	Photographs	CO2
	UNIT–VI :Concrete Mix Design (05 Hours)	5HRS		
1	Mix Design	Introduction & need	Flow charts	CO3
2	Input Data	Data required for mix design	Worksheets	CO3
3	Mix Types	Nominal & design mix	Comparison tables	CO3
4	Proportioning	Basic considerations	Examples	CO3

5	IS Method	IS 10262 mix design method	Step-wise problems	CO3
	UNIT–VII :Production of Concrete (06 Hours)	6HRS		
1	Batching	Methods of batching	Charts	CO4
2	Mixing	Mixing of concrete	Videos / samples	CO4
3	Transportation	Methods & precautions	Case study	CO4
4	Placing	Placing & compaction	Vibrator samples	CO4
5	Curing	Methods of curing	Charts	CO4
6	Formwork	Types, stripping	Models	CO4
	UNIT–X :Inspection & Quality Control (06 Hours)	6HRS		
1	Quality Control	IS 456 provisions	IS code	CO4
2	Variations	Factors affecting quality	Case discussion	CO4
3	Process Control	Mixing & placing as per IS 456	Checklists	CO4
4	Curing Control	Curing requirements	Charts	CO4
5	Inspection	Clause 17 of IS 456	Inspection formats	CO4

6	Durability	Durability provisions	Case examples	CO4
UNIT–XI :Special Concrete (06 H		6HRS		
1	RMC	Ready mix concrete	Videos	CO5
2	HPC	High performance concrete	Case study	CO5
3	Silica Fume	Silica fume concrete	Samples	CO5
4	Shotcrete	Gunitting	Site photos	CO5
5	Applications	Use cases	Discussion	CO5
6	Comparison	Advantages & limitations	Tables	CO5
	UNIT–XII :Deterioration of Concrete (06 Hours)	6HRS		
1	Deterioration	Types	Charts	CO6
2	Causes	Environmental effects	Case examples	CO6
3	Corrosion	Corrosion of reinforcement	Samples	CO6
4	Effects	Structural impact	Photographs	CO6
5	Prevention	Preventive measures	IS guidelines	CO6

6	Protection	Protective techniques	Demonstration	CO6
	UNIT–XIII :Repair Technology (06 Hours)	6HRS		
1	Defects	Symptoms & causes	Case photos	CO6
2	Cracks	Types of cracks	Charts	CO6
3	Repair Methods	Crack repair techniques	Samples	CO6
4	Polymer Repairs	Polymer based repair	Videos	CO6
5	Selection	Selection of repair method	Flowcharts	CO6
6	Case Study	Practical examples	Discussion	CO6

Signature of Faculty		Signature of HOD	