

**Course File**  
***Subject Title/Subject Code: CONCRETE TECHNOLOGY***  
***4CE4-08***

Semester: IV Year: II

Name of the Faculty: Mrs. Prachi Singhal

E-mail id: [prachi.singhal@technonjr.org](mailto:prachi.singhal@technonjr.org)

**Class Schedule**

**Total Number of Lectures: 42**

**i) Course Objective**

To develop proficiency in advanced structural analysis techniques, including deflection analysis, energy methods, influence line diagrams, and the study of arches and unsymmetrical bending, while applying approximate methods to analyze complex structural systems.

**INDEX - COURSE FILE**

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## VISSION & MISSION OF INSTITUTE

### Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

### Mission

**M1:** To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

**M2:** To establish effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.

**M3:** To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

**M4:** To develop ethical leaders with strong communication skills.

## VISION & MISSION OF DEPARTMENT

### Department Vision

To increase students learning of fundamentals for designing and planning of buildings and latest technologies through industry-aligned project-based learning which will help in transforming students to be good civil engineering professionals leading to innovation and incubation of new ideas.

### Department Mission

**M1:** To create experimental learning through solving problems of Government, Society, Smart Cities, Industry and other entities.

**M2:** To teach the latest technologies to the students as beyond the syllabus activity so that they are updated and industry ready.

**M3:** To enable engineering students understand industry-aligned technologies and learn to find solutions from their early engineering days and this is the only way to produce globally relevant engineers solving real-life problems applying current technologies.

**M4:** To enable students to generate projects through problem faced by and requirement of Smart cities, industry, Government and other entities whereby those outlined problem statements are to be studied deeply by a group of faculty members to convert them into real-time project format.

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

**PEOs 1:** To provide an in-depth understanding of the fundamentals of Civil Engineering and create a foundation for lifelong learning to facilitate a progressive career in the construction Industry, as an entrepreneur and in pursuit of higher studies.

**PEOs 2:** To equip the students with technical and analytical skills to develop innovative solutions to complex real-life problems using existing and novel technologies. To equip the students with good communication and interpersonal skills, inter-disciplinary teamwork and leadership skills to enable them to fulfill professional responsibilities.

**PEOs 3:** To expose them to various contemporary issues which will enable them to become ethical and responsible towards themselves, co-workers, Society and the Nation.

**PEOs 4:** To make the student's industry ready by imparting education related to the latest technologies so that they can grab future industry jobs.

## **PROGRAM SPECIFIC OUTCOMES (PSO's)**

**PSO1:** To be aware of and initiate some-work on future technologies and new developments which may impact the future Industry 4.0.

**PSO2:** Hands on training on upcoming technologies and project-based learning.

**PSO3:** Get exposure to BIM (Building Information Modeling).

## **PROGRAMME OUTCOMES (POs)**

**A student will develop:**

- PO01. ENGINEERING KNOWLEDGE:** An ability to apply knowledge of Mathematics, Science and Engineering Fundamentals in Electronics and Communication Engineering.
- PO02. PROBLEM ANALYSIS:** Ability to analyze and interpret data by designing and conducting experiments. Develop the knowledge of developing algorithms, designing, implementation and testing applications in electronics and communication related areas.
- PO03. DESIGN/ DEVELOPMENT OF SOLUTION:** An ability to Design a system Component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS:** Ability to Identify, formulate and solve engineering problems.
- PO05. MODERN TOOL USAGE:** An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
- PO06. THE ENGINEERING AND SOCIETY:** Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
- PO07. ENVIRONMENT & SUSTAINABILITY:** Understand the impact of professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.
- PO08. ETHICS:** An ability to understand the professional, social and ethical responsibility.
- PO09. INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. COMMUNICATION:** An ability to Communicate effectively in order to succeed in their profession such as, being able to write effective reports and design documentation, make effective presentations.
- PO11. PROJECT MANAGEMENT & FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in team, to manage projects and in multidisciplinary environment.
- PO12. LIFE-LONG LEARNING:** Recognize the need and an ability to engage in life-long learning.

## COURSE OUTCOMES (COs) OF THE SUBJECT

CO No.	Mapping	Statement
CO35301.1	<b>Understanding</b>	Student will be able to understand the chemical and physical properties of cement and aggregates, and their role in concrete performance.
CO35301.2	<b>Applying</b>	Student will be able to apply principles of concrete mix design to achieve desired strength, workability, and durability.
CO35301.3	<b>Analyzing</b>	Student will be able to analyze the effects of various factors on the properties of fresh and hardened concrete.
CO35301.4	<b>Analyzing</b>	Student will be able to analyze the performance of concrete structures using both standard and nondestructive testing methods.
CO35301.5	<b>Applying</b>	Student will be able to design and implement concrete construction practices that enhance the durability and sustainability of structures

## COS MAPPING WITH POs AND PSOs

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	2	1	2	1	0	0	2	0	0	0	0	1	2	1	2
<b>CO2</b>	3	2	2	1	0	0	2	0	0	0	0	1	3	2	2
<b>CO3</b>	2	1	2	1	0	0	2	0	0	0	0	1	2	1	2
<b>CO4</b>	3	2	2	3	0	0	2	0	0	0	0	1	3	2	2
<b>CO5</b>	2	1	2	1	0	0	2	0	0	0	0	1	2	1	2

# UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for even Semester for Session

Course: Bachelor of Technology (B.TECH.)				
Semester	II	IV	VI	VIII
Commencement of Classes	26.02.2024	15.02.2024	15.02.2024	02.01.2024
First Mid Term	02.04.2024	20.03.2024	20.03.2024	15.02.2024
Second Mid Term	03.06.2024	06.05.2024	06.05.2024	21.03.2024
Last Working Day	10.06.2024	31.05.2024	31.05.2024	20.04.2024
Commencement of Practical Exams	01.07.2024	03.06.2024	03.06.2024	22.04.2024
Commencement of Theory Exams	19.06.2024	14.05.2024	15.06.2024	02.05.2024
Project (VIII)	06.05.2024 to 15.05.2024			
Practical Training (After II Sem.)	15.07.2024 To 31.07.2024			
Practical Training (After IV Sem.)	01.07.2024 To 17.08.2024			
Practical Training (After VI Sem.)	01.07.2024 To 17.08.2024			
Commencement of Classes for next Odd Semesters (2023-24)	I	III	V	VII
	01.08.2024	01.08.2024	20.08.2024	20.08.2024

## ACADEMIC CALENDAR OF INSTITUTE

Academic Calendar for even Semester for Session 2023-24 (Even Semester)

Course: Bachelor of Technology (B.TECH.)				
Semester	II	IV	VI	VIII
Commencement of Classes	26-02-2024	15-02-2024	15-02-2024	2-01-2024
Commencement of First Mid Term	20-04-2024	25-03-2024	25-03-2024	15-02-2024
Commencement of Second Mid Term	05-06-2024	24-05-2024	24-05-2024	21-03-2024
Last Working Day	15-06-2024	31-5-2024	31-5-2024	20-04-2024
Commencement of Practical Exams	01-07-2024	04-6-2024	03-6-2024	22-04-2024
Commencement of Theory Exams	19-6-2024	15-6-2024	14-6-2024	02-05-2024
Project (VIII)	06.05.2024 to 15.05.2024			
Practical Training (After II Sem.)	15.07.2024 To 31.07.2024			
Practical Training (After IV Sem.)	01.07.2024 To 17.08.2024			
Practical Training (After VI Sem.)	01.07.2024 To 17.08.2024			



## Evaluation Scheme

### FACULTY DETAILS:

Name of the Faculty : Prachi Singhal  
Designation : Assistant Professor  
Department : Civil Engineering

### 1. TARGET

a) Percentage Pass: 100%  
b) Percentage I class: 60 %

### 2. METHOD OF EVALUATION

- Continuous Assessment Examinations (Mid-Term 1, Mid-Term 2)  
 Assignments / Seminars  
 Mini Projects  
 Quiz  
 Semester Examination

Others \_\_\_\_\_

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

4. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

**Signature of Faculty:**

**Signature of HOD**

UNIVERSITY SYLLABUS



**RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**SYLLABUS**

**II Year-IV Semester: B.Tech. (Civil Engineering)**

**4CE4-08: CONCRETE TECHNOLOGY**

**Credit: 3**

**Max. Marks: 150 (IA:30, ETE:120)**

**3L+0T+0P**

**End Term Exam: 3 Hours**

SN	CONTENTS	Hrs.
1	<b>Introduction:</b> to objective, scope and outcome of the subject	1
2	<b>Ingredients of concrete:</b> Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel- space ratio etc.	2
3	<b>Aggregates:</b> types, physical properties and standard methods for their determination, including Grading of aggregates as per IS. Manufactured sand- properties and IS Specifications for use in concrete.	2
4	<b>Concrete:</b> Grade of concrete, proportioning of ingredients, water content and its quality, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. Factors affecting, methods of determination.	4
5	Properties of hardened concrete such as strengths, permeability, creep, shrinkage, factors influencing, Standard tests on fresh and hardened concrete as per IS code. Aggregate- cement interface, its effect on properties of concrete.	4
6	<b>NDT:</b> Introduction and their importance. Application & use of Rebound Hammer, Ultra-sonic pulse velocity meter, Rebar & Cover meter, half-cell potential meter, corrosion resistivity meter, core sampling. Interpretation of their results,	4
7	<b>Concrete Handling in Field:</b> Batching, mixing, placing and transportation of concrete, equipment's for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipment. Curing of concrete: various methods their suitability.	4
8	Durability of concrete. Causes of deterioration, Carbonation, Tests for durability assessment	3
9	<b>Admixture in concrete:</b> Chemical and mineral admixtures, their types and uses: accelerator, retarders, water-proofing, plasticizers, super plasticizers- types, their suitability. Fly ash-properties for use in concrete, specifications of fly ash as per IS 3812, and effect on properties of concrete. GGBFS, Micro silica and metakaolin-properties, specifications and utility in concrete.	7

<b>10</b>	Concrete mix design (IS method)- with and without water reducing admixtures	<b>2</b>
<b>11</b>	<b>Form work:</b> Requirements, their types. Typical formworks and shuttering/centering for Columns, beams, slabs, walls, etc. Slip and moving formwork.	<b>3</b>
<b>12</b>	<b>Special types of concrete:</b> Sulphate resisting concrete, under water concreting, pump able concrete: methods and issues in making, salient properties and applications.	<b>3</b>
<b>13</b>	Concretes with tailored properties- including high performance concrete, with specific properties in fresh and hardened states, self-compacting concrete-materials, mix proportioning, test methods, use and applications with case studies.	<b>3</b>
<b>TOTAL</b>		<b>42</b>

#### **PRESCRIBED BOOKS**

1. Concrete Technology by M. S. Shetty, S. Chand & Co.
2. Concrete Technology by Neville & Brooks, Pearson Education.
3. Concrete: Microstructure, Properties & Materials by Mehta P. K, Tata McGraw Hill

## WEEKLY TIME TABLE OF THE TEACHER

First Time Table: with effect from (Date):

Day	1	2	3	4	5	6	7
Monday							
Tuesday			CT				
Wednesday							
Thursday							
Friday				CT			
Saturday	CT		CT				

## COURSE-PLAN

UNIT	Lect. No.	TOPICS	Teaching Methods/ Teaching Aids
1	1	<b>INTRODUCTION:</b> Objective, scope and outcome of the course.	White Board
2	2	hydration of cement and its Basic compounds	White Board
2	3	Structure of hydrated cement, C-S-H gel	White Board
2	4	Heat of hydration, gel-space ratio	White Board
3	5	Types, physical properties of aggregate.	White Board
3	6	Standard methods for their determination, including Grading of Aggregates as per IS	White Board
3	7	Manufactured sand- properties and	White Board
3	8	IS Specifications for use in Concrete.	White Board
4	9	Grade of concrete, proportioning of ingredients, water Content and its quality	White Board
4	10	Water/cement ratio and its role	White Board
4	11	Properties of fresh concrete Including workability	White Board
4	12	Air content, Flow ability, Segregation, Bleeding and Viscosity etc.	White Board
4	13	Factors affecting, methods of determination	White Board
5	14	<b>PROPERTIES OF HARDENED CONCRETE:</b> Strengths and permeability	White Board
5	15	Standard tests on fresh and hardened concrete as per IS code	White Board
5	16	Creep, shrinkage, factors influencing	White Board
5	17	Aggregate- cement interface, its effect on properties of concrete	White Board
6	18	Application of NDT& use of Rebound Hammer	White Board
6	19	Ultra-sonic pulse velocity meter, Rebar & Cover meter	White Board
7	20	<b>CONCRETE HANDLING IN FIELD:</b> Batching, mixing	White Board
7	21	Placing of concrete, transportation of concrete	White Board
7	22	Compaction of concrete: methods & equipment's	White Board

7	23	Curing of concrete: various methods their suitability	White Board
8	24	DURABILITY OF CONCRETE: Causes of deterioration	White Board
8	25	Carbonation process	White Board
8	26	Tests for durability assessment	White Board
9	27	Chemical and mineral admixtures, their Types and uses	White Board
9	28	Accelerator, retarders, plasticizers, Super plasticizers	White Board
9	29	Fly ash-properties for use in concrete	White Board
9	30	GGBFS: properties, specification sand utility in concrete	White Board
9	31	Micro silica: properties, specifications and utility in concrete	White Board
10	32	CONCRETE MIX DEIGN (IS METHOD): with water reducing admixtures	White Board
10	33	Concrete mix deign (IS method): without water reducing Admixtures	White Board
11	34	Form work: Requirements, their types	White Board
11	35	Typical formworks and shuttering/centering for Columns, beams	White Board
11	36	TYPICAL FORMWORKS AND SHUTTERING/centering for slabs, walls, etc	White Board
11	37	Slip and moving formwork	White Board
12	38	Special types of concrete: Sulphate resisting concrete: methods and issues in making, salient properties and applications.	White Board
12	39	under water concreting and pump able concrete	White Board
13	40	Concretes with tailored properties use and applications with case studies.	White Board
13	41	high performance concrete, with specific properties in fresh and hardened states	White Board
13	42	self-compacting concrete-materials, mix proportioning, test methods	White Board

**Signature of Faculty:**

**Signature of HOD**

## **Assignment – 1**

1. Explain the hydration process of cement, focusing on the role and formation of C-S-H gel. How does the gel-space ratio influence the properties of hardened concrete?
2. Describe the physical properties of aggregates that are critical for concrete production. How does the grading of aggregates as per IS specifications impact the quality of concrete?
3. Discuss the significance of the water/cement ratio in concrete mix design. How does it affect the properties of both fresh and hardened concrete? Provide examples to illustrate your points.
4. Examine the factors affecting the workability of concrete. What methods can be used to measure workability, and how do different factors influence these measurements?
5. Analyze the relationship between the aggregate-cement interface and the mechanical properties of hardened concrete. How does this interface affect the strength, permeability, and durability of concrete?

## Assignment – 2

1. Describe the standard tests used to evaluate the compressive strength, permeability, creep, and shrinkage of hardened concrete. Discuss how these properties influence the long-term performance of concrete structures.
2. Discuss the importance of nondestructive testing (NDT) in assessing the quality of concrete in existing structures. Compare the application and effectiveness of different NDT methods such as the Rebound Hammer, Ultrasonic Pulse Velocity meter, and core sampling.
3. Evaluate the role of chemical and mineral admixtures in modifying the properties of concrete. How do admixtures like superplasticizers, fly ash, and silica fume enhance the performance of concrete?
4. Describe the IS method of concrete mix design, with and without water-reducing admixtures.
5. Discuss the factors that must be considered in designing a durable concrete mix, especially in environments prone to chemical attack or severe weather conditions.



## SAMPLE QUIZ QUESTIONS

### Introduction

**1. What is the primary objective of studying concrete technology?**

- A) To learn about steel structures
- B) To understand the behavior and properties of concrete
- C) To design wooden frameworks
- D) To explore fluid mechanics in construction

**2. What is the main compound formed during the hydration of cement?**

- A) C-S-H gel
- B) Calcium hydroxide
- C) Gypsum
- D) Calcium carbonate

**3. The heat of hydration in cement is primarily due to:**

- A) Exothermic reactions during the setting process
- B) Endothermic reactions during mixing
- C) Heat absorbed from the environment
- D) Mechanical mixing of ingredients

**4. Manufactured sand used in concrete must comply with which IS specification?**

- A) IS 383
- B) IS 456
- C) IS 2386
- D) IS 10262

**5. Which physical property of aggregates is determined by sieve analysis?**

- A) Grading
- B) Density
- C) Porosity
- D) Specific gravity

**6. The workability of fresh concrete is primarily affected by:**

- A) Water/cement ratio
- B) Aggregate size
- C) Cement grade
- D) Ambient temperature

**7. Segregation in concrete refers to:**

- A) The separation of coarse aggregates from the mix
- B) The bleeding of water on the surface
- C) The compaction of concrete
- D) The curing process

**8. Which test is commonly used to assess the compressive strength of hardened concrete?**

- A) Slump test
- B) Rebound hammer test
- C) Cube test
- D) Ultrasonic pulse velocity test

**9. The Rebound Hammer test is used to evaluate:**

- A) Surface hardness of concrete
- B) Internal flaws in concrete

C) Corrosion potential of rebar

D) Concrete permeability

**10. Which admixture is used to increase the workability of concrete without adding extra water?**

A) Retarder

B) Accelerator

C) Superplasticizer

D) Corrosion inhibitor

**Mid Term Paper-I**  
**TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR**  
**B. TECH 2nd – YEAR (IV SEM.) – MT-I**  
**CONCRETE TECHNOLOGY (4CE4-08)**

**Time:** 3 Hr

**Max. Marks:**70

**Note:**

- 1) The paper is divided into 2 parts: Part-A and, Part-B.
- 2) Part-A contains 10 questions and carries 2 mark each.
- 3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

A.	What is flakiness index?	CO1
B.	What are the types of aggregates?	CO1
C.	Explain heat of hydration	CO1
D.	What is CSH gel?	CO1
E.	Explain specific gravity.	CO2
F.	Define bleeding of concrete mix.	CO2
G.	What is curing?	CO2
H.	What are the steps for concrete manufacturing process? Write them in right sequence.	CO2
I.	Write the constituents of cement.	CO3
J.	Define ‘workability’ of concrete mix.	CO3

Part- B (50 Marks)

1.	Write the names of basic compounds of cement and their role in hydration of cement.	CO1
OR		
1.	Briefly explain the factors affecting workability of concrete.	CO1
2.	Explain aggregate crushing value test.	CO1
OR		
2.	Define bulking of aggregates. Write the methods to test moisture content of aggregate.	CO1
3.	Differentiate between weigh batching and volume batching.	CO2
OR		
3.	What is grading of aggregate.	CO2
4.	What is under water concreting? Explain tremie method with diagram.	CO2
OR		
4.	What is compaction of concrete? What are the methods of compaction of concrete?	CO2
5.	How do we test the setting time of concrete? Explain in detail.	CO3
OR		
5.	Explain slump test with the help of diagram	CO3

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## Marks and Gap Analysis of Mid-Term I

S.No	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark ( Remedial Class need or not – Y/N )
1.	22ETCCE001	ANKIT KUMAR	54	N
2.	22ETCCE002	ARMAAN CHAUHAN	43	N
3.	22ETCCE003	AYUSH SINGH JHALA	38	N
4.	22ETCCE004	PARIDHI NINAMA	61	N
5.	22ETCCE005	PRAVEEN DANGI	47	N
6.	22ETCCE006	ROSHNI TABIYAR	56	N

\*(Y, if obtained marks are <50%)

**Signature of Faculty:**

**Signature of HOD**

## **Remedial Action Taken to Remove the Gaps (After Mid- Term 1)**

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

**Signature of Faculty:**

**Signature of HOD**

## Mid Term Paper-II

### TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

#### B. TECH 2<sup>nd</sup> – YEAR (IV SEM.) – MT-II

#### CONCRETE TECHNOLOGY (4CE4-08)

Time: 3 Hr

Max. Marks:70

**Note:**

- 4) The paper is divided into 2 parts: Part-A and, Part-B.
- 5) Part-A contains 10 questions and carries 2 mark each.
- 6) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

K.	What is bulking of sand?	CO1
L.	Differentiate between segregation and bleeding of concrete.	CO1
M.	Explain alkali-aggregate reaction.	CO2
N.	What is gel-space ratio?	CO2
O.	What is meant by creep of concrete?	CO3
P.	Give formula to calculate target mean strength.	CO3
Q.	What is carbonation?	CO4
R.	Write about the maturity concept.	CO4
S.	What is Self Compacting Concrete?	CO5
T.	Give any two requirements of a good formwork.	CO5

Part- B (50 Marks)

2.	Explain the role of water-cement ratio in concrete.	CO1
OR		
3.	Briefly explain the factors affecting mix-design of concrete.	CO1
4.	Explain rebound hammer test.	CO2
OR		
3.	Write about ultrasonic pulse velocity meter.	CO2
5.	Differentiate between plastic shrinkage and drying shrinkage.	CO3
OR		
5.	What is permeability of concrete and factors influencing it?	CO3
6.	Write short notes on super plasticizers.	CO4
OR		
6.	Write short notes on durability of concrete.	CO4

<p>6. Design a concrete mix of M30 reinforced concrete.  Type of cement- OPC 53 grade confirming to IS 12269  Maximum nominal size of aggregate- 20mm  Shape of CA- angular  Workability required at site- 100mm slump  Type of exposure structure is subjected to (as defined in IS 456)- moderate  Specific gravity of FA- 2.7  Specific gravity of CA- 2.8  Specific gravity of cement-3.15  Water absorption- CA=0.4%, FA= 1%  FA are confirming to zone I.</p>	CO5
OR	
<p>6. Design of M25 grade concrete as per IS 10262  Type of cement- OPC 43 grade confirming to IS 8112  Maximum nominal size of aggregate- 20mm  Minimum cement content – 320 kg/m<sup>3</sup>  Maximum water cement ratio-0.55  Workability- 75mm slump  Exposure condition- mild  Degree of supervision- good  Aggregate Zone I</p>	CO5

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## Marks and Gap Analysis of Mid-Term II

S.No	University Roll No.	Name of Student	Mid-Term II MM-70	Remark ( Remedial Class need or not – Y/N )
1.	22ETCCE001	ANKIT KUMAR	53	N
2.	22ETCCE002	ARMAAN CHAUHAN	42	N
3.	22ETCCE003	AYUSH SINGH JHALA	37	N
4.	22ETCCE004	PARIDHI NINAMA	60	N
5.	22ETCCE005	PRAVEEN DANGI	46	N
6.	22ETCCE006	ROSHNI TABIYAR	55	N

\*(Y, if obtained marks are <50%)

**Signature of Faculty:**

**Signature of HOD**

## Remedial Action Taken to Remove the Gaps (After Mid- Term 1I)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

**Signature of Faculty:**

**Signature of HOD**

Model Question Paper

<b>4E1318</b>	Roll No. _____	Total No. of Pages: <span style="border: 1px solid black; padding: 2px;">2</span>
	<b>4E1318</b> <b>B. Tech. IV - Sem. (Main) Exam., - 2022</b> <b>Civil Engineering</b> <b>4CE4 – 08 Concrete Technology</b>	

Time: 3 Hours

Maximum Marks: 70

*Instructions to Candidates:*

*Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

**PART – A**

**(Answer should be given up to 25 words only)**

**[10×2=20]**

**All questions are compulsory**

- ~~Q.1~~ List the Bogue's compounds present in cement with its composition.
- ~~Q.2~~ Write about heat of hydration.
- ~~Q.3~~ What is the purpose of adding an air entraining admixture to concrete?
- ~~Q.4~~ Differentiate between Nominal Mix and Design Mix.
- ~~Q.5~~ What is Batching in concrete?
- Q.6 Define Laitance.
- ~~Q.7~~ Name any four properties of hardened concrete.
- ~~Q.8~~ On what circumstances high grade concretes are utilize effectively?
- ~~Q.9~~ What is the use of IS 383?
- ~~Q.10~~ Name the admixture used for quick setting of concrete.

[4E1318]

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## **PART – B**

**(Analytical/Problem solving questions)**

**[5×4=20]**

**Attempt any five questions (Word limit 100)**

- ~~Q.1~~ Explain initial and final setting time of cement.
- ~~Q.2~~ What is curing of concrete and its significance?
- ~~Q.3~~ Differentiate between accelerators and retarders.
- ~~Q.4~~ Classify the aggregate and its important role in concrete.
- Q.5 Discuss the tests for workability of concrete.
- ~~Q.6~~ Describe the durability of concrete.
- Q.7 Explain the effect of GGBFS on concrete properties.

## **PART – C**

**(Descriptive/Analytical/Problem Solving/Design Questions)**

**[3×10=30]**

**Attempt any three questions**

- ~~Q.1~~ Explain the hardening and strength gaining of cement.
- Q.2 Find the quantity of Cement, Coarse Aggregate and Fine Aggregate in Kg/m<sup>3</sup> by IS method for the following requirements: <https://www.rtuonline.com>
- (a) Characteristics compressive strength at 28 days: 25 N/mm<sup>2</sup>
  - (b) Maximum nominal size of aggregate: 20 mm
  - (c) Shape of aggregate: angular
  - (d) Slump requirement: 50 mm
  - (e) Sand Zone -II
  - (f) Free Water Cement Ratio: 0.55(for mild exposure, Reinforced Concrete)
  - (g) Specific Gravity of cement = 3.15, Coarse aggregate = 2.7, and Fine aggregate= 2.6
  - (h) Water absorption of Coarse aggregate = 0.5%, Fine aggregate = 1%
- ~~Q.3~~ How will you determine the compressive strength of cement? Explain briefly the procedure.
- Q.4 Write short note of any two NDT method.
- ~~Q.5~~ What are Super Plasticizers? How are these helpful in modifying the properties of concrete?

## STUDENT PERFORMANCE REPORT

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
22ETCCE001	ANKIT KUMAR	54	53	53.5
22ETCCE002	ARMAAN CHAUHAN	43	42	42.5
22ETCCE003	AYUSH SINGH JHALA	38	37	37.5
22ETCCE004	PARIDHI NINAMA	61	60	60.5
22ETCCE005	PRAVEEN DANGI	47	46	46.5
22ETCCE006	ROSHNI TABIYAR	56	55	55.5

**Signature of Faculty:**

**Signature of HOD**

## RESULT ANALYSIS

S.NO.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARKS	SESSIONAL MARKS	TOTAL
		MAX MARKS	70	30	100
1.	22ETCCE001	ANKIT KUMAR	Result pending	24	
2.	22ETCCE002	ARMAAN CHAUHAN	Result pending	19	
3.	22ETCCE003	AYUSH SINGH JHALA	Result pending	17	
4.	22ETCCE004	PARIDHI NINAMA	Result pending	27	
5.	22ETCCE005	PRAVEEN DANGI	Result pending	21	
6.	22ETCCE006	ROSHNI TABIYAR	Result pending	25	

TOTAL	PASS	FAIL	ABSENT	PASS %
6				

## **Indirect Assessment:**

### **Overall Teacher Self-Assessment (at the completion of course) in terms of course objective and outcomes**

#### **Course Objectives:**

It aims to deepen students' understanding of advanced structural analysis techniques essential for civil engineering. It covers the unit load method for deflection analysis, energy methods for evaluating strain energy under various loading conditions, and the application of Castigliano's theorems to both determinate and indeterminate structures. Students will learn to construct and interpret influence line diagrams, analyze the effects of rolling loads, and study the behavior of arches under different support conditions. Additionally, the course introduces unsymmetrical bending, focusing on the computation of stresses and the location of the shear center. Approximate methods for analyzing multistory frames subjected to lateral loads, as well as the tension coefficient method for space trusses, are also explored. Through this course, students will develop the analytical skills necessary to solve complex structural problems, preparing them for professional practice in civil engineering.

#### **Course Outcomes:**

At the end of this course students will be able to:

CO1: Student will be able to understand the chemical and physical properties of cement and aggregates, and their role in concrete performance.

CO2: Student will be able to apply principles of concrete mix design to achieve desired strength, workability, and durability.

CO3: Student will be able to analyze the effects of various factors on the properties of fresh and hardened concrete.

CO4: Student will be able to analyze the performance of concrete structures using both standard and nondestructive testing methods.

CO5: Student will be able to design and implement concrete construction practices that enhance the durability and sustainability of structures.

#### **Methodology to identify bright student**

It is done by considering a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas. Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

#### **Efforts to keep students engaged**

1. Active Learning:
  - Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.
2. Varied Teaching Methods:

- Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.
3. Technology Integration:
- Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

### **Methodology to identify weak student**

It is done by considering a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review etc. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

### **Targeted interventions for weak student**

#### **1. Additional Resources**

Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

#### **2. Remedial classes**

Establish a tutoring program where students can receive extra help from teachers.

#### **3. Flipped classroom**

Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.