

Advanced Concrete Technology Lab

(GR22D5010)

I-M. Tech – I Semester

(2022-23)

by

Mr. SP Raju/V. Ramesh/ PVVSSR KRISHNA

Assistant Professor



Department of Civil Engineering

Gokaraju Rangaraju Institute of Engineering and Technology

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Advanced Concrete Technology Lab

Course File Check List

S. No.	Name of the Format	Page No.
1	Syllabus	
2	Time Table	
3	Program Educational Objectives	
4	Program Objectives	
5	Course Objectives	
6	Course Outcomes	
7	Students Roll List	
8	Guide lines to study the course books & references, course design & delivery	
9	Course Schedule	
10	Unit Plan/Course Plan	
11	Evaluation Strategy	
12	Assessment in relation to COB's and CO's	
13	Tutorial Sheets	
14	Assignment Sheets	
15	Rubric for course	
16	Mappings of CO's and PO's	
17	Model question papers	
18	Mid-I and Mid-II question papers	
19	Mid-I marks	
20	Mid-II marks	
21	Sample answer scripts and Assignments	
22	Course materials like Notes, PPT's, Videos, etc,	



GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED CONCRETE TECHNOLOGY LAB

Course Code: GR22D5010
I Year I Semester

L/T/P/C: 0/0/4/2

Prerequisites: Concrete Technology Theory and Practical.

Course Objectives:

1. Familiarize the students with physical, chemical and mechanical properties of cement concrete constituents and understand the mix design of high-grade concrete.
2. Analyze the stress-strain curve of high strength concrete and develop correlation between cube and cylinder of high strength concrete.
3. Determine the mechanical properties of high strength concrete and knowledge on cyclic loading on steel.
4. To conduct Non-Destructive testing methods on existing concrete members and behaviour of beams under flexure.
5. To study the behaviour of self-compacting concrete and existing RC structures reinforcement details and corrosion levels.

Course Outcomes:

1. Design high grade concrete and identify, carry out laboratory tests related to the use of concrete on site.
2. Develop correlation between cube and cylinder of high strength concrete and analyze the stress-strain curve.
3. Interpret the mechanical properties of high strength concrete and examine the effect of cyclic loading on steel
4. Assess the quality of existing concrete members by Non-Destructive testing methods and study the behaviour of beams under flexure.
5. Analyze the behaviour of Self Compacting Concrete and understanding reinforcement details and corrosion levels in existing RC structures.

List of Experiments/Assignments:

1. Conduct basic tests on cement and aggregates.
2. Design the mix proportions for high strength concrete.
3. Study the stress-strain curve of high strength concrete.
4. Study the correlation between cube and cylinder of high strength concrete.
5. Determine the split tensile strength of high strength concrete
6. Determine the modulus of rupture of high strength concrete.
7. Determine the compressive strength of existing concrete members by Non-Destructive testing method.

8. Assess the quality of existing concrete members by Non-Destructive testing method.
9. Study the flow properties of self compacting concrete.
10. Evaluation of air content in concrete.
11. Optimization of dosage of super plasticizer in cement.
12. Demonstration on how to locate reinforcement details in any existing RC structures.
13. Demonstration on assessing the level of corrosion in the existing RC structures.

Reference Books:

1. Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012.
2. Concrete Technology, Shetty M. S., S. Chand and Co., 5th edition, 2006

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Department of Civil Engineering
Advanced Concrete Technology Lab

TIME TABLE

I M. Tech (GR-22) - I Semester

AY: 2022-23

Day/Hour	09:00-10:00	10:00-11:00	11:00-12:00	12:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00
MONDAY				LUNCH	ACT LAB		
TUESDAY							
WEDNESDAY							
THURSDAY							
FRIDAY					ACT Lab		
SATURDAY							

	Advanced concrete Technology Laboratory	Mr.S.P Raju/Mr.V.Ramesh(1646)/Mr.PVVSSR Krishna (Mr.PVVSSRK-1562)
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Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1:

Graduates of the program will equip with professional expertise on the theories, process, methods and techniques for building high-quality structures in a cost-effective manner.

PEO 2:

Graduates of the program will be able to design structural components using contemporary softwares and professional tools with quality practices of international standards.

PEO 3:

Graduates of the program will be effective as both an individual contributor and a member of a development team with professional, ethical and social responsibilities.

PEO 4:

Graduates of the program will grow professionally through continuing education, training, research, and adapting to the rapidly changing technological trends globally in structural engineering.

PROGRAM OUTCOMES:

PO 1: An ability to independently carry out research / investigation and development to solve practical problems

PO 2: An ability to write and present a substantial technical report / document.

PO 3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor's.

PO 4: Possesses critical thinking skills and solves core, complex and multidisciplinary structural engineering problems.

PO 5: Assess the impact of professional engineering solutions in an environmental context along with societal, health, safety, legal, ethical and cultural issues and the need for sustainable development.

PO 6: Recognize the need for life-long learning to improve knowledge and competence.



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COURSE OBJECTIVES

Academic Year : 2022-23 Semester : I

Name of the Program: M.Tech Year: I Year Section: A

Course/Subject : Advanced Concrete Technology Lab Course Code : GR22D5010

Name of the Faculty : Mr. SP Raju/V.Ramesh/PVVSSR KRISHNA

Designation: Assistant Professor Department: Civil Engineering

On completion of this Subject/Course the student shall be able to:

S. No	Course Objectives
1	Familiarize the students with physical, chemical and mechanical properties of cement concrete constituents and understand the mix design of high grade concrete.
2	Analyze the stress-strain curve of high strength concrete and develop correlation between cube and cylinder of high strength concrete.
3	Determine the mechanical properties of high strength concrete and knowledge on cyclic loading on steel.
4	To conduct Non-Destructive testing methods on existing concrete members and behaviour of beams under flexure.
5.	To study the behaviour of self-compacting concrete and existing RC structures reinforcement details and corrosion levels.

Signature of HOD

Signature of faculty

Date:

Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the objectives.



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COURSE OUTCOMES

Academic Year : 2022-23 **Semester** : **II**

Name of the Program: M.Tech **Year: I Year Section: A**

Course/Subject : Advanced Concrete Technology Lab **Course Code** : GR22D5010

Name of the Faculty : Mr. SP Raju/V.Ramesh/PVVSSR KRISHNA

Designation: Associate Professor / Assistant Professor

Department: Civil Engineering

On completion of this Subject/Course the student shall be able to:

S. No	Course Outcomes
1	Design high grade concrete and identify, carry out laboratory tests related to the use of concrete on site.
2	Develop correlation between cube and cylinder of high strength concrete and analyze the stress-strain curve.
3	Interpret the mechanical properties of high strength concrete and examine the effect of cyclic loading on steel
4	Assess the quality of existing concrete members by Non-Destructive testing methods and study the behaviour of beams under flexure.
5	Analyze the behaviour of Self Compacting Concrete and understanding reinforcement details and corrosion levels in existing RC structures.

Signature of HOD

Signature of faculty

Date:

Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the objectives.



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
2022-23 BATCH STUDENT ROLL LIST

S.No	Reg No	Student Name
1	22241D2001	A MAHESHKUMAR
2	22241D2002	AHMED ABDUL AZEEM
3	22241D2003	BAIRAPAKA BHARAT
4	22241D2004	B ACHSAHKEERTHANA
5	22241D2005	CHAKALI SOWMYA
6	22241D2006	CHAPPIDI NARESH
7	22241D2007	D HARIDEEP KUMAR
8	22241D2008	DEVIREDDY ANISH
9	22241D2009	D NAGENDAR
10	22241D2010	G SUSHANTH REDDY
11	22241D2011	JEREPOTHULARAVALIKA
12	22241D2012	KADABOHINASAIPAVAN
13	22241D2013	K BHARAT KUMAR
14	22241D2014	MACHARLA SRINIVAS
15	22241D2015	MALLI SREENIVASULU
16	22241D2016	SHAIK ABDUL MUQEED
17	22241D2017	SHAIK ZABI ULLAH
18	22241D2018	S SAHILSHIVAJIRAO
19	22241D2019	L LAKSHMI NARAYANA

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

GUIDELINES TO STUDY THE COURSE SUBJECT

Academic Year : 2022-23

Semester : I

Name of the Program: M.Tech.

Year: I Section: A

Course/Subject: Advanced Concrete Technology Lab **Course Code:** GR22D5010

Name of the Faculty: Mr. SP Raju/V.Ramesh/PVVSSR KRISHNA

Department: Civil Engineering

Designation: Assistant Professor

Guide line to study the course/subject: Advanced Concrete Lab

This course helps the students to learn and understand, with the concept of physical and engineering properties of cement, fine aggregate, coarse aggregate, mix design for high strength concrete mixes, strength characteristics, workability and permeability properties of both normal and self compacting concrete.

So the students should have the following prerequisites:

- Basic knowledge of mathematics,
- Should have good knowledge on concrete technology subject
- Ability to perform exercise as well as analyze and interpret data.

Where will this subject help?

- Advance Concrete Technology helps civil engineers to clearly understand various sophisticated aspects of concrete.
- To apply the important properties like strength, permeability, sulphate attacks etc., to be considered in various constructions
- To become familiar with common laboratory tests to classify and characterize the properties of cement, fine and coarse aggregate.



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Department of Civil Engineering

BOOKS AND MATERIALS

Text Books

1.	Advanced Concrete Technology Lab Manual
2.	CONCRETE TECHNOLOGY by M S Setty
3.	Concrete technology by Navelle

Suggested / Reference Books

6.	Concrete technology by N Krishna Raju
7.	Concrete Technology by M L Ghambhir

Web Sites

8	https://www.youtube.com/watch?v=6ju8mig4VoU&list=PLbMVogVj5nJT6RXK4VKPGOfWHp2ZH8xin
.	https://www.youtube.com/watch?v=yzpWGCh9j6Y
	https://www.youtube.com/watch?v=jZHf90PSaac



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COURSE DESIGN AND DELIVERY SYSTEM (CDD)

- The Course syllabus is written into number of learning objectives and outcomes.
- These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.
- Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
- The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

- Understand the principles of Learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, unit and lesson plans
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback to students using various methods of Assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

COURSE SCHEDULE

Academic Year : 2022-23

Semester : I

Name of the Program: M.Tech.

Year: I

Section: A

Course/Subject: Advanced Concrete Technology Lab

Course Code: GR22D5010

Name of the Faculty: Mr. SP Raju/V.Ramesh/P Krishna

Department: Civil Engineering

Designation: Assistant Professor

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Introduction and Demonstration	28-10-2022	28-10-2022	1 day
2.	Cycle-I	30-10-2022	22-12-2022	9 Weeks
3.	Cycle-II	30-12-2022	18-02-2022	8 Weeks
4.	Revision of Exercise-I/II Experiments	20-03-2022	25-03-2022	1 Weeks
5	Preparation and Practical Examinations	08-03-2023	14-03-2023	1 Weeks
6	End Semester Examinations	15-03-2023	01-04-2023	2 Weeks

1. Total No. of Instructional periods available for the course: **23** sessions / Periods



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Advanced Concrete Technology Lab

Cycle-1:

List of Experiments/Assignments:

1. Conduct basic tests on cement and aggregates.
2. Design the mix proportions for high strength concrete.
3. Study the stress-strain curve of high strength concrete.
4. Study the correlation between cube and cylinder of high strength concrete.
5. Determine the split tensile strength of high strength concrete

Cycle-II:

6. Determine the modulus of rupture of high strength concrete.
7. Study the effect of cyclic loading on steel.
8. Determine the compressive strength of existing concrete members by Non-Destructive testing method.
9. Assess the quality of existing concrete members by Non-Destructive testing method.
10. Study the flow properties of self compacting concrete.
11. Evaluation of air content in concrete.
12. Optimization of dosage of super plasticizer in cement.
13. Demonstration on how to locate reinforcement details in any existing RC structures.
14. Demonstration on assessing the level of corrosion in the existing RC structures.

Reference Books:

1. Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012.
2. Concrete Technology, Shetty M. S., S. Chand and Co., 2006



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SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic Year : 2022-23

Semester : II

Name of the Program: M.Tech.

Year: I **Section: A**

Course/Subject: Advanced Concrete Technology Lab

Course Code: GR22D5010

Name of the Faculty: Mr. SP Raju/V.Ramesh/P Krishna

Department: Civil Engineering

Designation: Assistant Professor

The Course plan for the whole Course / Subject is:

Exercise	Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Objectives & Outcomes Nos.	References (ACT Lab Manual) Page Nos.: ___ to ___
1	1	28-10-2022	3	Introduction to ACT Lab		
	2	31-10-2022	3	Tests on cement - Consistency	COB'S- 1to 5 CO'S- 1 to 5	8
	3	04-11-2022	3	Setting times of cement	COB'S- 1to 5 CO'S- 1 to 5	10
	4	07-11-2022	3	Soundness & Fineness of cement	COB'S- 1to 5 CO'S- 1 to 5	14
	5	11-11-2022	3	Specific gravity of cement		
	6	14-11-2022	3	Compressive Strength of cement	COB'S- 1to 5 CO'S- 1 to 5	18
	7	18-11-2022	3	Gradation Charts of Aggregates.	COB'S- 1to 5 CO'S- 1 to 5	16
	8	21-11-2022	3	Bulking of fine Aggregate	COB'S- 1to 5 CO'S- 1 to 5	22
	9	25-11-2022	3	Bulking of fine Aggregate	COB'S- 1to 5 CO'S- 1 to 5	28
2	10.	28-11-2022	3	Design the mix proportions for high strength concrete.	COB's - 1 CO's - 1	31-36
3	11	02-12-2022 05-12-2022	6	Study the stress-strain curve of high strength concrete.	COB's - 2 CO's - 2	37
4	12	09-12-2022 12-12-2022	6	Study the correlation between cube and cylinder of high strength concrete.	COB's - 2 CO's - 2	38
5	13	16-12-2022 19-12-2022	3	Determine the split tensile strength of high strength concrete	COB's - 2 CO's - 2	39-41
	14	19-12-2022	3	Revision of Cycle II	COB's -1 to 5 CO's -1to 5	
6	14	30-12-2022	3	Determine the modulus of rupture of high strength concrete	COB's - 2 CO's - 2	42-44
7	15	02-01-2023 06-01-2023	6	Assess the quality of existing concrete members by Non-Destructive testing method.	COB's - 3 CO's - 3	45

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8	16	09-01-2023 13-01-2023	6	Study the flow properties of self-compacting concrete.	COB's - 4 CO's - 4	46-53
9	17	16-01-2023 20-01-2023	6	Study the flow properties of self-compacting concrete.	COB's - 5 CO's - 5	54
	18	23-01-2023 27-01-2023	6	Study the flow properties of self-compacting concrete.	COB's - 5 CO's - 5	56
	20	30-01-2023 03-02-2023	6	Study the flow properties of self-compacting concrete.	COB's - 5 CO's - 5	58
	21	06-02-2023 10-02-2023	6	Study the flow properties of self-compacting concrete.	COB's - 5 CO's - 5	60
10	22	10-02-2023	3	Evaluation of air content in concrete	COB's - 1 CO's - 1	64-66
11	23	13-02-2023	3	Optimization of dosage of super plasticizer in Mortars	COB's - 3 CO's - 3	67-69
12	24	17-02-2023	3	Demonstration on how to locate reinforcement details in any existing RC structures	COB's - 5 CO's - 5	70-72
13	23	20-02-2023	3	Demonstration on assessing the level of corrosion in the existing RC structures.	COB's - 5 CO's - 5	73-75
14	24	24-02-2023	3	Revision of Cycle II	COB's -1 to 5 CO's -1to 5	-
15	26	27-02-2023	3	Internal Examination	COB's -1 to 5 CO's -1to 5	-

Signature of HOD

Signature of faculty

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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 1 Duration of Lesson: 3hr
Lesson Title : Determination of Normal consistency of cement

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Normal consistency of cement
2. Importance of Normal consistency
3. Procedure to find the Normal consistency.
4. Impact of water content on Normal consistency

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Vicat Apparatus,
Normal consistency,
Percentage of water,
Gauging Time
Plasticity.

Assignment question:

1. Explain the procedure about determining optimum amount of water content to be consistent. COB-1, CO1

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering

Lesson No : 2 Duration of Lesson: 3hr

Lesson Title : Determination of Initial & Final Setting times of cement

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Initial & Final Setting times of cement
2. Importance of Normal consistency in Initial & Final Setting times of cement
3. Procedure to find Initial & Final Setting times of cement.
4. Impact of water content on Initial & Final Setting times of cement

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Vicat Apparatus, Needle,
Initial & Final Setting times of cement,
Percentage of water,
Gauging Time
Start of losing Plasticity & completely losing Plasticity.

Assignment / Questions:

1. Write the difference between Initial and final setting time. COB-1,CO1

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I

Name of the Program: M.Tech **Year:** I Year

Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010

Name of the Faculty : : Mr. SP Raju/V.Ramesh/P Krishna

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 3 **Duration of Lesson:** 3hr

Lesson Title : Determination of Soundness of cement

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Soundness of cement.
2. Importance of Normal consistency in Soundness of cement.
3. Test Procedure to find Soundness of cement due to excess lime content.
4. Importance of soundness in construction , expansion limit in cement

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Le chatlier Apparatus,
Soundness & unsound ness of cement,
Permissible Limit of expansion in cement.

Assignment / Questions:

1. What are main compounds which involve in expansion of cement and indicate the limits. COB-1,CO1

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering

Lesson No : 4 Duration of Lesson: 3hr
Lesson Title : Determination of Specific gravity of cement

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Specific gravity of cement.
2. Importance & role of Specific gravity of cement in preparing concrete.
3. Test Procedure to find Specific gravity of cement using density bottle method.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Density bottle method Apparatus,
Specific gravity of cement,
Importance of kerosene in as a media in find Specific gravity of cement.

Assignment / Questions:

1. Mention the IS code provision for specific gravity of cement and limits. COB-1,CO1

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 5 **Duration of Lesson:** 3hr
Lesson Title : Determination of Fineness of cement.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Fineness of cement.
2. Importance & role of Fineness of cement in preparing concrete.
3. Test Procedure to find Fineness of cement using sieve analysis.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fineness of cement ,
Sieve analysis,
Importance of Fineness of cement,
Limits of fineness.

Assignment / Questions:

1. What are the advantages of fine cement and mention the code provision. COB-1,CO1

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 6 **Duration of Lesson:** 3hr

Lesson Title : Determination of Compressive Strength of cement

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Compressive Strength of cement
2. Importance & role of Compressive Strength of cement in preparing concrete.
3. Test Procedure to find Compressive Strength of cement
4. Experience Importance of curing
5. Have knowledge on gain of compressive strength of cement with time.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Compressive Strength of cement
Water requirement to on strength of cement
Curing peroid

Assignment / Questions:

1. How much percentage of strength should be gained at 3,7,28 days of curing. COB-1,CO1

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 7 **Duration of Lesson:** 3hr
Lesson Title : Determination of Bulking of sand

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Bulking of sand
2. Importance & role of Bulking of sand
3. Test Procedure to find Bulking of sand
4. Experience Importance of Bulking of sand
5. Gain knowledge on bulking of sand.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Bulking of sand
Percentage of bulking
Percentage of Moisture content
Surface moisture content on fine aggregate
Effect of bulking on different grading like fine grading, medium grading & coarse grading.
Optimum moisture content.

Assignment / Questions:

1. What is the importance of bulking and why we conduct experiment.CO1,CO1

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 8 Duration of Lesson: 3hr
Lesson Title : Determination of fineness modulus of Fine Aggregate

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Sieve Analysis
2. Importance & role of Sieve Analysis
3. Test Procedure to find fineness modulus of fine aggregate
4. Experience & Importance of Fineness modulus ,Average size of aggregate
5. Gain knowledge on sieve sizes.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Sieve Analysis
Fineness modulus ,
Average size of aggregate .

Assignment / Questions:

1. What do you mean by fineness modulus and mention the limits of FM for fine aggregates. COB-1,CO1

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 9 **Duration of Lesson:** 3hr
Lesson Title : Determination of fineness modulus of Coarse Aggregate

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about Sieve Analysis
2. Importance & role of Sieve Analysis
3. Test Procedure to find fineness modulus of Coarse aggregate
4. Experience & Importance of Fineness modulus ,Average size of aggregate
5. Gain knowledge on sieve sizes.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Sieve Analysis
Fineness modulus ,
Average size of aggregate.

Assignment / Questions:

1. What do you mean by fineness modulus and mention the limits of FM for coarse aggregates. COB-1,CO1

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 10 **Duration of Lesson:** 3hr
Lesson Title : Determination of Workability of fresh concrete using Slump test of Concrete

INSTRUCTIONAL/LESSON OBJECTIVES

1. Learn about Workability of fresh concrete using Slump test of concrete
2. Importance & role of Workability
3. Test Procedure to find Workability of fresh concrete using Slump test of concrete
4. Experience Importance of setting time of concrete
5. Gain knowledge on gain of compressive strength of cement with time.
6. Experience effect Water /cement ratio on Workability.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,Workability ,
Water / Cement Ratio, Slump of concrete,
Type of slump: True, shear and collapse ,
Degree of workability: Very low, Low, Medium ,High, very high.

Assignment / Questions:

1. What are the different types of slump and mention the value of slump to be used in roads, slabs, beams, columns and foundations. COB-3,CO3

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 11 **Duration of Lesson:** 3hr

Lesson Title : Design the mix proportions for high strength concrete.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about mix design of high strength mixes
2. Design the mixes under different controls
3. Gain knowledge to design based on Entroy Shecklock graphs.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

- Design the mixes under different factors like
1. Low, medium, high and very high workability
 2. Under good or average control
 3. Size of coarse and fine aggregates

Assignment / Questions:

1. Design the mix proportion for high strength mix M60 with following factors medium workability, size of aggregate 20mm, good control. COB-3,CO3

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 12 **Duration of Lesson:** 3hr

Lesson Title : Study the stress-strain curve of high strength concrete and split tensile strength

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about tensile Strength of concrete
2. Importance & role of tensile Strength of concrete with time
3. Test Procedure to find tensile Strength of concrete.
4. Experience how to get the graph between stress and strain
5. Gain knowledge on gain of tensile strength of cement with time.

TEACHING AIDS : White board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,
Hardened concrete,
Curing period,
Failure of specimen due to tensile load

Assignment / Questions:

1. Write the importance of tensile strength of concrete. COB-2,CO2

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 13 **Duration of Lesson:** 3hr
Lesson Title : Study the correlation between cube and cylinder of high strength concrete.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

2. Learn about tensile and Compressive Strength of concrete
3. Importance & role of tensile and Compressive Strength of concrete with time
4. Test Procedure to find Compressive and tensile Strength of concrete cube and cylinder.
5. Experience the procedure to cast cube and cylinder
6. Gain knowledge on gain strength of concrete with time.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,
Hardened concrete,
Curing period,
Failure of compression specimen

Assignment / Questions:

1. Show the variation of percentage gain in compressive and tensile strength of cube and cylinder. COB-2,CO2

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program : M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 14 **Duration of Lesson:** 3hr

Lesson Title : Determine the modulus of rupture of high strength concrete.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about flexure Strength of concrete beam
1. Importance & role of flexure Strength of concrete beam with time
2. Test Procedure to find modulus of rupture.
3. Experience casting of beams
4. Gain knowledge on gain of flexure strength of concrete with time.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,
Hardened concrete,
Curing period,
Failure of beam specimen under three point load

Assignment / Questions:

1. How to find modulus of rupture of concrete. COB-3,CO3

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 15,16 **Duration of Lesson:** 6hr

Lesson Title : Determine the compressive strength of existing concrete members by NDT method_
Assess the quality of members using NDT

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- 1.Learn about different NDT test methods
1. Importance & role of NDT method to find strength of any structure
2. Test procedure to access the quality of structures
3. Experience the usage of equipment under different cases
4. Gain knowledge on NDT methods and their applications.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,
Hardened concrete
Strength for different structural elements

Assignment / Questions:

1. Name different NDT tests and explain any one method briefly. COB-4,CO4

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 17,18,19,20,21 **Duration of Lesson:** 15hr
Lesson Title : Study the flow properties of self-compacting concrete_

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about flow properties of SCC mixes
2. Importance & role of SCC in constructions
3. Test Procedure to find passing ability, filling ability and flow ability, time
4. Gain knowledge on different equipments usage like U-Box, L-Box, J-Ring, Slump flow and V-Funnel
5. Able to get the ease of performance of SCC using different admixtures.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Self compacting concrete mix design
Admixtures to increase ease of flow
Mixing of SCC with various proportions
Passing, filling ability
Flow spread, flow time

Assignment / Questions:

1. Write different tests to find passing ability of SCC mixes. COB-5, CO-5

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 22 **Duration of Lesson:** 3hr
Lesson Title : Evaluation of air content in concrete..

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Understand the disadvantages of air content in concrete
2. Test Procedure to find air content
3. Gain knowledge on equipment usage like air entrainment apparatus.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh Concrete
Air entrainment test procedure
Calculation of air content

Assignment / Questions:

1. What are the minimum limits of percentage of air content in concrete. COB-4,CO-4

Signature of faculty



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Department of Civil Engineering

LESSON PLAN

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year: I Year**
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering
Lesson No : 23 **Duration of Lesson:** 3hr
Lesson Title : Optimization of dosage of super plasticizer in Mortars INSTRUCTIONAL/LESSON

OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about the usage of super plasticizer and its optimum content
2. Importance & role of super plasticizer
3. Test Procedure to find optimum percentage of super plasticizer
4. Gain knowledge on marsh cone stability test procedure

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Cement
Super plasticizer
Mixing of cement
Sieving of cement after mixing with super plasticizer

Assignment / Questions:

1. What is the importance of this test. COB-5,CO-5

Signature of faculty



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Department of Civil Engineering

COURSE COMPLETION STATUS

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
Exercise - I	Covered on time	1	1
Exercise – II	Covered on time	2	2
Exercise – III	Covered on time	2	2
Exercise - IV	Covered on time	2	2
Exercise - V	Covered on time	2	2
Exercise - VI	Covered on time	2	2
Exercise - VII	Covered on time	3	3
Exercise - VIII	Covered on time	4	4
Exercise - IX	Covered on time	4	4
Exercise - X	Covered on time	5	5
Exercise - XI	Covered on time	5	5
Exercise - XII	Covered on time	5	5

Signature of HOD

Signature of faculty





Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
EVALUATION STRATEGY

Academic Year : 2022-23

Semester : I

Name of the Program: M.Tech. **Year: I** **Section: A**

Course/Subject: Advanced Concrete Technology Lab **Course Code:** GR22D5010

Name of the Faculty: Mr. SP Raju/V.Ramesh/P Krishna

Department: Civil Engineering

Designation: Assistant Professor

1. TARGET:

- a) Percentage for pass: 100%
- b) Percentage of class:

First class with distinction	10
First class	6
Pass class	3
Total strength	19

2. COURSE PLAN & CONTENT DELIVERY

- 72 to 102 practice classes held for detailed demonstration of experiments and for analyzing real time experiments in the lab.

3. METHOD OF EVALUATION

- 3.1 Continuous Assessment Examinations (CAE-I, CAE-II)
- 3.2 Assignments/Seminars
- 3.3 Mini Projects
- 3.4 Quiz
- 3.5 Semester/End Examination
- 3.6 Others

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

- Introducing new experiments relating to soil design parameters.

Signature of HOD

Date:

Signature of faculty

Date:



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440
Assessment in relation to CO's and COB's

Assessment:

1. Assignment
2. Internal Examination
3. External Examination
4. Practical Projects
5. Viva

Course Outcomes					
	1	2	3	4	5
Assessments					
1	X			X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X

Course Objectives					
	1	2	3	4	5
Assessments					
1		X		X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X

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 Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440
Mappings of CO's, COB's Vs PO's, POB's

Course Objectives - Course Outcomes Relationship Matrix

Course Outcomes Course Objectives	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

Course Outcomes - Program Outcomes relations (Contributions: High, Medium and Low)

Advanced Concrete Lab (GR22D5010) CO's	1	2	3	4	5	6
1. Design high grade concrete and identify, carry out laboratory tests related to the use of concrete on site.	H	M	M		M	H
2. Develop correlation between cube and cylinder of high strength concrete and analyze the stress-strain curve.	M		M		M	M
3. Interpret the mechanical properties of high strength concrete and examine the effect of cyclic loading on steel	H	M	M			M
4. Assess the quality of existing concrete members by Non-Destructive testing methods and study the behavior of beams under flexure.	H		M		M	H
5. Analyze the behavior of Self Compacting Concrete and understanding reinforcement details and corrosion levels in existing RC	H	H	H	M	H	M

Course Objectives - Program Outcomes (PO's) Relationship Matrix

Course Objectives \ Program Outcomes	Program Outcomes					
	1	2	3	4	5	6
1	H	M	M		M	H
2	M		M		M	M
3	H	M	M			M
4	H		M		M	H
5	H	H	H	M	H	M

Course Outcomes - Program Outcomes relations (PO's) Relationship Matrix

Course Outcomes \ Program Outcomes	Program Outcomes					
	1	2	3	4	5	6
1	X	X	X		X	X
2	X		X		X	X
3	X	X	X			X
4	X		X		X	X
5	X	X	X	X	X	X

Course: (Advanced Concrete Lab GR22D5010)-Program Outcomes (PO's) Relationship Matrix

Courses \ Program Outcomes	1	2	3	4	5	6
	1	x		x	x	x

Program Educational Objectives (PEOs) - Course Outcomes Relationship Matrix

Course Outcomes \ Program Educational Objectives	1	2	3	4
	1	x		
2	x		x	x
3	x	x	x	
4	x	x		
5	x		x	x



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Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440
Assessment in Program Outcomes (PO's) Relationship Matrix

Assessment:

1. Assignment
2. Internal Examination
3. External Examination
4. Practical Projects
5. Viva

Program Outcomes Assessments	1	2	3	4	5	6
1	x	x				
2	x			x	x	x
3	x			x	x	x
4	x		x	x	x	x
5	x			x	x	x

Assignments & Assessments-Program Educational Objectives (PEO's) Relationship Matrix

Assessment:

1. Assignment
2. Internal Examination
3. External Examination
4. Practical Projects
5. Viva

Program Educational Objectives Assessments	1	2	3	4
1	X	X		
2	X		X	X
3	X		X	X
4	X		X	X
5	X		X	X



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440
Rubric Template – Advanced Concrete Lab

Academic Year : 2022-23 **Semester** : I
Name of the Program: M.Tech **Year:** I Year
Course/Subject : Advanced Concrete Lab **Course Code** : GR22D5010
Name of the Faculty : Mr. SP Raju/V.Ramesh/P Krishna
Designation : Assistant Professor **Department:** Civil Engineering

		Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
Name of the Student	Performance Criteria	1	2	3	4	5	
22241D2001	Level of knowledge on fundamental laboratory tests and collect, analyze or synthesize appropriate data.	Inability to perform fundamental laboratory tests or collect, analyze, or synthesize appropriate data	Able to collect, analyze, and synthesize data related to the properties and behavior of concrete in the advanced concrete laboratory	Ability to observe collection of samples, perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data.	Knowledge on collection of Samples & independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with few procedural errors	Full knowledge on collection of soil samples, independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with no procedural errors	5
	Level of knowledge on properties of SCC mixes and assessment using appropriate laboratory analysis.	Low level of knowledge on scc properties and the respective laboratory analyses.	Able to understand the importance of SCCmixes and effecting factors.	Ability to apply the knowledge of scc properties in choosing appropriate laboratory analysis	Full Knowledge on properties of scc and assessment of vital parameters using laboratory analyses.	Analyzing all practical aspects of scc properties and their key role in the field of construction.	5
	Level of knowledge on tensile , compressive and flexure strength properties and their real time applications.	Low level of knowledge on strength parameters and their real time applications.	Able to understand the strength parameters under various loading conditions.	Ability to apply the knowledge in the determination of strength parameters	Full knowledge on strength parametersand the respective laboratory analyses.	Analyzing the importance of strength parameters under various existing conditions and their respective applications.	5



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Department of Civil Engineering

Advanced Concrete Technology Lab

MTech I Year I SEM

2022-23 AY

1. a) Name and conduct the experiment which is used to find out the percentage of water to be added to the cement to get workable cement paste.
b) Explain briefly the significance of compressive strength of cement and Write the test procedure.
2. a) Conduct the experiment which is used to find out the fineness of the cement and explain about the importance.
b) Design a Mix proportion for M80 Grade of concrete for OPC 53 grade conforming to IS 269, Metakaolin, Maximum nominal size of aggregate: 20 mm, Exposure conditions as per Table 3 and Table 5 of IS 456: Moderate (for reinforced concrete, Workability: 100 mm (slump), Method of concrete placing: Pumping, Maximum cement (OPC) content: 450 kg/m³, Chemical admixture type: Superplasticizer (Sulphonate Naphthalene formaldehyde), Specific gravity of cement: 3.15
c) Specific gravity of 1) Coarse aggregate (at SSD condition): 2.74 2) Fine aggregate conforming to zone-II (at SSD condition): 2.65 3) Fly ash: 2.20 4) Silica fume: 2.60 5) Chemical admixture: 1.17
3. a) Determine Specific gravity of cement and mention its Codal Provision.
b) Find out the specific gravity of Coarse aggregate for a given sample and the importance of it
4. a) Determine Fineness modulus of Fine aggregates (1 kg sample) and mention the limits and codal provision
b) Determine Fineness modulus of coarse aggregates (5 kgs sample) and mention the limits and codal provision
5. a) Find out the maximum percentage of bulking and OMC of sand using laboratory test with neat graph.
b) Determine the soundness of cement by using Le-chatelier apparatus and Explain its significance
6. a) Find out the maximum percentage of bulking of sand using field test.
b) Explain the significance of split tensile strength and compressive strength of concrete.
7. a) Conduct SCC test using V Funnel apparatus
b) Explain the procedure for conducting L-Box test and its limitations as per code?

8. a) Conduct SCC test using U Box apparatus
b) Explain the procedure for conducting V-Funnel test and its limitations as per code?

9. a) Conduct SCC test using L Box apparatus
b) Explain the procedure for conducting slump flow test and its limitations as per code?

10. a) Conduct SCC test using Slump flow apparatus
b) Explain the procedure for conducting J Ring test and its limitations as per code?

11. a) Conduct SCC test using J Ring test apparatus
b) Explain the procedure for conducting U Box test and its limitations as per code?

12. a. Determine the optimum percentage of dosage of super plasticizer in cement mortar.
b. Explain the test procedure for calculation of Air content in Fresh concrete

13. a) Determine the compressive strength of given structural members using rebound hammer test.
b) Demonstrate the procedure to assess the levels of corrosion using profometer test in existing RC structures

14. a) Assess the quality of concrete for a given structural element without destroying it
b) Demonstrate the procedure to locate the Reinforcement details in existing RC structures using Profometer.



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(8 Pages)

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. **59718**

H.T. No.	2	2	2	4	1	D	2	0	1	3
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Name of the Examination Advanced Concrete Technology Lab

Course STE Branch Civil Date 27-08-2023

Signature of the Invigilator

29/08/23

9/10

START WRITING FROM HERE

- 5) (a) find out the maximum percentage of bulking and one of sand using laboratory test with neat graph
- (b) Determine the soundness of cement by using Le-chatelier's apparatus and explain its significance.

(a) Bulking of Sand

Aim :- To determine the maximum percentage of bulking of sand

Apparatus - Two test tubes with capacity of 200 ml and tamping rod 20mm diameter, trays

Reference code : IS 2386 - 1999

Theory :-

Optimum moisture content (m_{opt}) in sand will have the changes in volume to determine percentage of bulking with help of 2 test tubes capacity of 200ml and performing this experiment at the certain room temperature $\pm 29^{\circ}\text{C}$. We notice the changes in volume and find the bulking of sand as per IS 2386. The volume is increase in moisture content. The volume may increase upto 20 to 40% when moisture content is 5 to 10%.

Procedure :-

1. Take 500g of sand weigh it accurately.
2. Mix the sand and take tube with capacity of 200ml and fill it upto 200ml of wetting sand and take the reading at M_1 .
3. After pour it to tray and mix the water content ratio amount adding to that mix
4. and mix it thoroughly and pour in tubes wait 1 minute

5. Tamping the surface slowly and the sand particles are settled then note the reading at H_2

6. And find the tabulated the values and find the bulking of sand by using formula.

$$\text{percentage bulking of sand} = \frac{w_1 - w_2}{w_2} \times 100 \text{ (field)}$$

$$\text{Laboratory} = w_2 - w_1$$

	Reading 1	Reading 2	Reading 3
weight of sand, w_1	200	200	200
Adding 100ml w/c ratio			
Bulking of sand			

S.NO	weight of sand	water cont Ratio	Initial reading (w_1)	final reading (w_2)	Bulking of sand $w_2 - w_1$
1	200g	2	200	235	35
2	200g	4	200	240	40
3	200g	6	200	238	38 38
4	200g	8	200	220	20

Precautions

1. Apparatus are handling with safe
2. mixing properly with w/c ratio
3. Avoid manual errors

Result :-

percentage of bulking of sand = 40%

Conclusion :-

As per IS 2386 the bulking of sand is 40% below and 20 to 40% of omc. and we get 40% so hence it is use.

(b) Soundness of Cement

Aim:

To determine the soundness of cement and volume change in the process of setting and hardening.

Apparatus:

Le-chatelier apparatus, Tray and sponge (wet), plate glass

Reference code : IS 4031 - 1988 (part 3)

Theory:

For soundness of cement there change in volume when it is setting and hardening stage as per the IS 4031 - 1988 (part 3) the value for first reading it is been 8-12 mm and the second reading is 0-3 mm greater than first reading. we know the soundness of cement for the cement sand mix and final we calculate what is the expansion is not more than 10 mm

procedure:

1. first take 100g of cement and add the certain percentage of water to it and mix the specimen and ready before pouring
2. clean the le-chatelier apparatus before mix ready

3. And pour the mix in the specimen it been touch to top surface, level it
4. After put the glass plates at top and bottom and also weights. Tapping the equipment for steady of mix.
5. After put it in 24 hours at curing setting and breaking the cement and note the readings.

Observations:-

1. Initial reading = 10
2. Final reading = 15

$$\begin{aligned}
 \text{Expansion} &= \text{Reading 2} - \text{Reading 1} \\
 &= 15 - 10 \\
 &= 5.
 \end{aligned}$$

RESULT :-

$$\text{Expansion} = \underline{5 \text{ mm}}$$

Conclusion:-

we get the cement is sound at per (5mm)
 IS 4031 - 1988 (part 3)



Gokaraju Rangaraju Institute of Engineering & Technology

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(8 Pages)

Bachupally, Kukatpally, Hyderabad - 500090

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No.

59165

H.T. No.

2 2 2 4 1 0 2 0 1 4

Name of the Examination

concrete technology Lab

Course

M.Tech - 1st year 1st SEM Branch Civil

Date 27/02/2023

Signature of the Invigilator

START WRITING FROM HERE

5/10

Q: Determine Fineness modulus of fine aggregate [1 kg Sample] and coarse aggregates (5 kgs Sample) and mention the limits and codal provision.

Ans: AIM:- Determination of fineness modulus of fine aggregate and coarse aggregate.

Apparatus & Materials:-

1) Electronic weighing machine

2) Sieves As per IS standard. [1mm 5mm]

3) Tray for material carrying

4) 1 kg Fine aggregate.

5) 5 kg Coarse aggregate.

6) For Fine aggregate sieve. [4.75mm 2.36mm, 1.18mm
0.60mm 0.30mm, 0.15mm]

7) For Coarse aggregate sieve [20mm 16mm 12mm
10mm 4.75mm]

Theory:- By using sieve analysis method we can determine the Fineness modulus of fine aggregate and coarse aggregate. Sand particle size 1mm to 2mm is known as fine aggregate and 2mm to 5mm is known as coarse aggregate. Different purpose construction fine & coarse aggregate material can be used for example wall finishing purpose fine aggregate cement mortar can be used, for concrete making coarse aggregate can be used as per standard specification.

Procedure:-

- 1) Take 1 kg of fine aggregate and sieve with 2mm sieve.
- 2) Take 5 kg coarse aggregate and sieve with 25mm sieve.
- 3) Weigh the remaining fine aggregate noted as W_1 .

- ② Weigh the remaining coarse aggregate $[W_2]$

Procedure:

- 1) Take sieve for fine aggregate is 0.15mm, 0.3, 0.6, 1.18, 2.36 and 4.75mm sizes.
- ② Take 1 kg sand by using electronic weigh machine.
- ③ Pour the sand on top 4.75 mm size sieve and vertical vibration to apply for 15 min.
- ④ Weigh the remaining material by using electronic weigh machine [4.75, 2.36, 1.18, 0.6, 0.3, 0.15 mm size material should be weight]
- ⑤ Note in table and find the Fineness modulus of coarse aggregate by calculation
- ⑥ Take sieve for coarse aggregate is 4.75mm, 10mm, 12mm, 16mm, 20mm size
- ⑦ Take 5 kg aggregate by using electronic weighing machine
- ⑧ Pour the aggregate on top 20mm sieve and vibration apply for 15 min
- ⑨ weigh the remaining material by using electronic weigh machine [20mm, 16mm, 12mm, 10mm, 4.75mm material should be weigh and note]

⑩ Noted in a table and find the fineness modulus of coarse aggregate by calculation.

Fine ~~Coarse~~ aggregate :- 1000 gr (or) 1 kg

IS standard Sieve size ①	Weight remaining ②	Percentage retain ③	Cumulative Percentage @retain ④	Per. Passing (100 - col. 4) ⑤
4.75 mm	15 gr	1.5%	1.5	98.5
2.36 mm	16 gr	1.6%	3.1	96.9
1.18 mm	221 gr	22.1%	25.2	74.8
0.60 mm	325 gr	32.5%	57.7	42.3
0.30 mm	260 gr	26.0%	83.7	16.3
0.15 mm	143 gr	14.3%	98.0	2.0
Wust	20 gr	2.0%	100.00	0
Total			369.2	

$$\text{Fineness modulus} = \frac{\text{Total Cumulative Percentage retain}}{100}$$

$$= \frac{369.2}{100} = 3.69$$

Fineness modulus of fine aggregate is = 3.69

As per ^{IS} ~~code~~ provision the value should be < 5

Coarse aggregate

5000 gr (or) 5 kg

IS Standard Sieve size (1)	Weight remaining (2)	Percentage retaining (3)	Cumulative Percentage remaining (4)	% Pass (100 - col 4) (5)
20mm	335 gr	6.7%	6.7	93.3
16mm	1610 gr	32.2%	38.9	61.1
12mm	2140 gr	42.8%	81.7	18.3
10mm	790 gr	15.8%	97.5	2.5
4.75mm	60 gr	1.2%	98.7	1.3
Waste	65 gr	1.3%	100	0

Total

423.5

$$\text{Fineness modulus of Coarse aggregate} = \frac{\text{Total Cumulative Percentage retaining}}{100}$$
$$= \frac{423.5}{100} = 4.23$$

Fineness modulus of Coarse aggregate is 4.23

As per IS code provision the value should be within the 5

Fineness of fine aggregate is 2.69

Fineness of coarse aggregate is 4.23

both values within the permissible limit

~~hence~~

Conclusion:- After experiment the fineness modulus of fine aggregate and coarse aggregate within limit of standard.

GR22 2022-23 M.Tech MTECH STE 110, Section: A GR22D5010 Advanced Concrete Technology Lab Sessional Marks

S.No	Roll No	Lab Internals	Assessment Marks	Record Marks	Lab Attendance Marks	Sessional Marks
1	22241D2001	8	10	10	9	37
2	22241D2002	7	9	10	8	34
3	22241D2003	5	4	4	6	19
4	22241D2004	8	10	10	9	37
5	22241D2005	6	7	8	7	28
6	22241D2006	7	4	4	10	25
7	22241D2007	6	7	6	7	26
8	22241D2008	8	9	10	9	36
9	22241D2009	5	4	5	5	19
10	22241D2010	5	4	5	5	19
11	22241D2011	5	6	7	7	25
12	22241D2012	7	8	9	7	31
13	22241D2013	9	9	10	7	35
14	22241D2014	5	7	8	6	26
15	22241D2015	6	8	10	8	32
16	22241D2016	7	9	10	10	36
17	22241D2017	5	6	6	6	23
18	22241D2018	7	8	9	7	31
19	22241D2019	5	3	4	5	17