Advanced Concrete Lab

(GR20D5010)

I-M. Tech – I Semester

(2021-22)

by

Mr. Y. Kamala Raju

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 Lab

Course File Check List

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GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ADVANCED CONCRETE LAB

Course Code: GR20D5010 **L/T/P/C: 0/0/2/2**
I Year I Semester

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

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. 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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Department of Civil Engineering

Advanced Concrete Lab

TIME TABLE

I M. Tech (GR-20) - I Semester				AY: 2021-22				wef : 15-11-2021	
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	Room No.	
MONDAY				Lunch				Theory/ Tutorial	4203
TUESDAY								Lab	4108&4110(AC Lab)
WEDNESDAY					**ADVANCED CONCRETE LAB**				
THURSDAY								**M.Tech Co-ordinator**	
FRIDAY									
SATURDAY	**ADVANCED CONCRETE LAB**							**Dr. V Srinivasa Reddy (1117)**	

Sub. Code	Subjects	Faculty Name
GR20D5010	Advanced Concrete Lab	Dr.V. Srinivasa Reddy (Dr.VSR-1117)/Mr. Y. Kamala Raju (929)

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Department of Civil Engineering

PROGRAMME EDUCATINAL 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 contempory 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 and develop solutions for a practical problems in structural engineering.

PO 2: An ability to present technical information in form of structural drawings and documents conforming to desired specifications.

PO 3: The student should develop in-depth proficiency in the analysis and design of advanced structures, HSC/HPC mixes, Shells and foded plates, earth quake resistant buildings, ability to model, discriminate elastic/plastic behaviour of materials and synthesize new designs using contemporary softwares.

PO 4: Ability to assess the impact of professional engineering solutions in environmental context along with societal, health, safety, legal, ethical and cultural issues and the need for sustainable development.

PO 5: Ability to possess critical thinking skills and solve core, complex and multidisciplinary structural engineering problems.

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

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COURSE OBJECTIVES

Academic Year : 2021-2022 **Semester : I**

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

Course/Subject : Advanced Concrete Lab **Course Code** : GR20D5010

Name of the Faculty : Mr. Y Kamala Raju

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 : 2021-2022 **Semester : II**

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

Course/Subject : Advanced Concrete Lab **Course Code** : GR20D5010

Name of the Faculty : Mr. Y Kamala Raju

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

2021-22 BATCH STUDENT ROLL LIST

S.No	Reg No	Student Name
1	21241D2001	ATKAPURAM PRASHANTH
2	21241D2002	BANDI SRI RAM GOPAL
3	21241D2003	CHALLA MADHAVI
4	21241D2004	PAMMI DIVYA
5	21241D2005	DUMMA UMESH KUMAR
6	21241D2006	K LATHASREE
7	21241D2007	MARIYALA VAISHNAVI
8	21241D2008	MAVOORI PRANAV
9	21241D2009	MITTAPALLI NAGA ASHWINI
10	21241D2010	R VENKATA SURAJ REDDY
11	21241D2011	REPATI MOHAN BABU
12	21241D2012	SANDHYA CHERUKU
13	21241D2013	SHAIK FEROZ
14	21241D2014	SK SAI CHANDRA
15	21241D2015	THOTA HARSHAVARDHAN
16	21241D2016	VARIKUPPALA LALITHA
17	21241D2017	Y RAMA GNANENDRA SAI
18	21241D2018	YENUMALA DEVESH GOUD
19	21241D2019	S PRASHANTH KUMAR
20	21241D2020	B THARUN TEJA
21	21241D2021	G NITISH KUMAR

Signature of HOD

Date:

Signature of faculty

Date:

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

GUIDELINES TO STUDY THE COURSE SUBJECT

Academic Year : 2021-2022

Semester **: I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Mr.Y. Kamala Raju **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 "soil" as an engineering material, the index and engineering properties and methods used to characterize soil for Geotechnical analysis and design.

So the students should have the following prerequisites:

- Basic knowledge of mathematics, science, engineering and fluid mechanics
- Strength of Materials and Basics and applied soil mechanics
- Ability to perform exercise as well as analyze and interpret data.

Where will this subject help?

- To understand the interaction between water and soil and the effects of static vs. flowing water on soil strength.
- To understand the fundamental differences between behaviors of sands and clays and between total and effective stresses.
- To become familiar with common laboratory tests to classify soils and characterize index and engineering properties of soil.

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Department of Civil Engineering

BOOKS AND MATERIALS

Text Books	
1.	Advanced Concrete 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=yzpWGrh9j6Y** **https://www.youtube.com/watch?v=jZHf90PSaac**

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Department of Civil Engineering

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

Date:

Signature of faculty

Date:

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Department of Civil Engineering

COURSE SCHEDULE

Academic Year : 2021-2022 **Semester** : II

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Mr. Y. Kamala Raju **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	17-11-2021	17-11-2021	1 day
2.	**Cycle-I**	18-11-2021	18-01-2022	9 Weeks
3.	**Cycle-II**	20-01-2022	16-03-2022	8 Weeks
4.	Revision of Exercise-I/II Experiments	20-03-2022	25-03-2022	1 Weeks
5	Preparation and Practical Examinations	27-03-2022	02-04-2022	1 Weeks
6	End Semester Examinations	03-04-2022	17-04-2022	2 Weeks

1. Total No. of Instructional periods available for the course: **48** Hours / Periods

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Department of Civil Engineering

Advanced Concrete 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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Department of Civil Engineering
SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic Year : 2021-2022 **Semester** : II

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Mr. Y. Kamala Raju **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.	18-11-2021	3	Tests on cement - Consistency, Setting times, Soundness, Compressive Strength.	COB's - 1,3 CO's - 1,2	30 to 38
	2.	25-11-2021	3	Gradation Charts of Aggregates.	COB's - 1,3 CO's - 1,2	21 to 24
	3.	1-12-2021	3	Bulking of fine Aggregate	COB's - 1,3 CO's - 1,2	16 to 20
2.	4.	15-12-2021	3	Aggregate Crushing and Impact value	COB's - 1,3 CO's - 1,2	10 to 15
	5.	19-12-2021	3	Workability Tests on Fresh self compacting concrete	COB's - 1,3 CO's - 1,2	59 to 62
	6.	1-1-2022	3	Air Entrainment Test on fresh concrete..	COB's - 1,3 CO's - 1,2	62 to 66
3.	7.	6-1-2022	3	Marsh cone test.	COB's - 1,3 CO's - 1,2	67 to 73
	8.	11-1-2022	3	Permeability of Concrete	COB's - 1,3 CO's - 1,2	63 to 64
	9.	18-2-2022	3	Non Destructive Testing of Concrete	COB's - 1,3 CO's - 1,2	74 to 79
	10.	28-2-2022	3	Accelerated Curing of Concrete.	COB's - 1,3 CO's - 1,2	94 to 101
4.	11.	1-3-2022	3	Influence of W/C ratio on strength and Aggregate / Cement ratio on workability and Strength	COB's - 1,3 CO's - 1,2	45 to 58
	12.	8-3-2022	3	Influence of Different Chemical Admixtures on concrete	COB's - 1,3 CO's - 1,2	80 to 86

Signature of HOD

Signature of

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

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 1 Duration of Lesson: 6hr

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.

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

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Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 2 Duration of Lesson: 6hr

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:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 3 Duration of Lesson: 6hr

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:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 4 Duration of Lesson: 6hr

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:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 5 Duration of Lesson: 6hr

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:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

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Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 6 Duration of Lesson: 6hr

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:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

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

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 7 Duration of Lesson: 6hr

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:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 8 Duration of Lesson: 6hr

Lesson Title : Determination of fine ness 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:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 9 Duration of Lesson: 6hr

Lesson Title : Determination of fine ness 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:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 10 Duration of Lesson: 6hr

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:

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

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 11 Duration of Lesson: 6hr

Lesson Title : Determination of Workability of fresh concrete using Compaction Factor test of concrete

INSTRUCTIONAL/LESSON OBJECTIVES:

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

1. Learn about Workability of fresh concrete using Compaction factor test of concrete
2. Importance & role of Workability in compaction
3. Test Procedure to find Workability of fresh concrete using Compaction factor 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 in terms of compaction.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,Workability ,

Water / Cement Ratio, Compaction factor,

Partially compacted, Fully compacted.

Range of compaction factor-0.78-0.95

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 12 Duration of Lesson: 6hr

Lesson Title : Determination of Workability of fresh concrete using Vee Bee test of Concrete

INSTRUCTIONAL/LESSON OBJECTIVES:

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

1. Learn about Workability of fresh concrete using Vee Bee test of concrete
2. Importance & role of Workability in vibration
3. Test Procedure to find Workability of fresh concrete using Vee Bee 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 in terms of vibration.

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

Fresh concrete ,Workability ,

Water / Cement Ratio, vibration,

Measurement Of vibration in time.

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 13 Duration of Lesson: 6 hr

Lesson Title : Determination of Compressive Strength of concrete

INSTRUCTIONAL/LESSON OBJECTIVES:

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

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

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

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

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 14 Duration of Lesson: 6 hr

Lesson Title : Determination of accelerating curing of concrete

INSTRUCTIONAL/LESSON OBJECTIVES:

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

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

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

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

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : **I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Dr V Srinivasa Reddy and Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Lesson No : 15 Duration of Lesson: 6 hr

Lesson Title : Determination of air entrainment of concrete

INSTRUCTIONAL/LESSON OBJECTIVES:

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

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

TEACHING AIDS : white board, marker, Demonstration

TEACHING POINTS :

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

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

COURSE COMPLETION STATUS

Academic Year : 2021-2022

Semester **: I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Mr. Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
Exercise - I	Covered on time	1	1,2
Exercise – II	Covered on time	2	2,5
Exercise – III	Covered on time	3	3,6
Exercise - IV	Covered on time	4	4,7

Signature of HOD Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

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

Academic Year : 2021-2022

Semester **: I**

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

Course/Subject: Advanced Concrete Lab **Course Code:** GR20D5010

Name of the Faculty: Mr.Y. Kamala Raju **Department:** Civil Engineering

Designation: Assistant Professor

1. TARGET:
   a) Percentage for pass: 100%
   b) Percentage of class:

First class with distinction	20
First class	01
Pass class	0
Total strength	21

2. **COURSE PLAN & CONTENT DELIVERY**
   - 87 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:

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Assessment in relation to CO's and COB's

Assessment:

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

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Mappings of CO's, COB's Vs PO's, POB's

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

Advanced Concrete Lab (GR20D5010) CO's	a	b	c	d	e	f	g	h	i	j	k	l
Design high grade concrete and identify, carry out laboratory tests related to the use of concrete on site.	H	H		M						M		H
Develop correlation between cube and cylinder of high strength concrete and analyze the stress-strain curve.	M	H		H								M
Interpret the mechanical properties of high strength concrete and examine the effect of cyclic loading on steel	M			M				M				H
Assess the quality of existing concrete members by Non-Destructive testing methods and study the behaviour of beams under flexure.	H	M						H	M	M		
Analyze the behaviour of Self Compacting Concrete and understanding reinforcement details and corrosion levels in existing RC structures.	H	M						H	M	M		M

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Assessment in Program Outcomes (PO's) Relationship Matrix

Assessment:

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

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

Assessment:

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

Constituents – Program Outcomes (Po's) Relationship Matrix

Constituencies: 1) Industry 2) Management 3) Students 4) Parents

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Rubric Template – Advanced Concrete Lab

Academic Year : 2021-2022 **Semester:** II

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

Course/Subject : Advanced Concrete Lab **Course Code** : GR20D5010

Name of the Faculty : Mr.Y. Kamala Raju

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

Objectives: To learn theory and practical aspects of Advanced Concrete Lab

		Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
Name of the Student	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
21241D2012	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 soils in the geotechnical 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	4
	Level of knowledge on properties of soil and assessment using appropriate laboratory analysis.	Low level of knowledge on soil properties and the respective laboratory analyses.	Able to understand the importance of vital soil parameters and effecting factors.	Ability to apply the knowledge of soil properties in choosing appropriate laboratory analysis	Full Knowledge on properties of soil and assessment of vital parameters using laboratory analyses.	Analyzing all practical aspects of soil properties and their key role in the field of construction.	4
	Level of knowledge on strength parameters of soil and their real time applications.	Low level of knowledge on strength parameters of soil and their real time applications.	Able to understand the strength parameters of soil under various loading conditions.	Ability to apply the knowledge in the determination of strength parameters of soil	Full knowledge on strength parameters of soil and the respective laboratory analyses.	Analyzing the importance of strength parameters of soil under various existing conditions and their respective applications.	5

Students Outcomes: Learn applications of different Advanced Concrete Lab and Hands on experience in research

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

Advanced Concrete Lab

Internal Examination Model Question Paper

01. Determine the Initial Setting Time of Given Cement Sample and Briefly Explain the components, types of cements.

02. Determine The Normal Consistency of the Given Cement Sample & Explain the Importance of Normal Consistency of cement.

03. Determine The Soundness Of The Given Cement Sample. & Explain The Boge's components Of Cement.

04. Determine The Compressive Strength of the Given Cement Sample and Explain the types of cements.

05. Determine The Optimum Dosage Superplasticizer Of The Given Cement Sample By Marsh Cone Test & what are types of admixtures

06. Determine The Bulking OF Given Fine Aggregate Sample In The Laboratory.

07. Determine The Bulking OF Given Fine Aggregate Sample In The Field.

08. Determine The Fineness Modulus Of Course Aggregates. Explain The Effect Of Air Entrainment Test On Fresh Concrete.

09. Determine Crushing Strength Of The Given Course Aggregates Sample. Write A Short Note On Influence Of W/C Ratio On Compressive Strength

10. Determine The Impact Strength Of The Given Course Aggregates Sample. Write A Short Note On Influence Of W/C Ratio On Compressive Strength.

11. Determine The Compressive Strength of Given Beam Element and column element By Non Destructive Testing of Concrete (Rebound Hammer Test).

12. Determine The Compressive Strength Of M25 Grade Of Concrete For W/C Ratio Of 0.40 By Accelerated Curing Of Concrete & Write A Short Note On The Influence Of Different Chemical Admixtures On Concrete.

13. Determine The Slump Value M20 Grade Of Concrete For W/C Ratios Of 0.50. Write A Short Note On The Influence Of Different Chemical Admixtures On Concrete.

14. Examine The Effect of Partial Compaction To Fully Compaction Of Fresh Concrete Of M25 Grade For Water To Cement Ratios Of 0.45. Write A Short Note On The Influence Of Different Chemical Admixtures On Concrete.

15. Determine The Vee- Bee Time of M25 Grade of Concrete At w/c ratio is 0.40. Write A Short Note On The Influence Of Different Chemical Admixtures On Concrete.

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PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. ... 30233

H.T. No. | 2 | 1 | 2 | 4 | 1 | D | 2 | 0 | 1 | 0 |

Name of the Examination M.Tech 1st year 1st sem Lab Internal Examination

Course ACT lab Branch civil Date 19/03/22

Signature of the Invigilator

START WRITING FROM HERE

14) Objective :- The objective of the slump flow test is to determine the flowability of the self compacting concrete

Apparatus :- slump cone, flow measurement board.

Materials :- fine aggregate, coarse aggregate, cement, water, fly ash, super plasticizer.

Theory :- Self compacting concrete means no need of vibration or) compaction. The main advantage of SCC is man Power will be less, cost of construction will be less, vibrator is not required, easy placing of concrete.

GR20 2021-22 M.Tech MTECH STE 110, Section: A GR20D5010 Advanced Concrete Lab Sessional Marks

S.No	Roll No	Lab Internals	Assessment Marks	Record Marks	Lab Attendance Marks	Sessional Marks
1	21241D2001	7	6	5	5	23
2	21241D2002	7	6	5	4	22
3	21241D2003	5	7	5	5	22
4	21241D2004	7	7	5	3	22
5	21241D2005	4	4	5	4	17
6	21241D2006	7	6	5	3	21
7	21241D2007	8	8	5	5	26
8	21241D2008	5	6	5	3	19
9	21241D2009	5	6	5	4	20
10	21241D2010	3	4	5	4	16
11	21241D2011	3	6	5	5	19
12	21241D2012	6	7	5	3	21
13	21241D2013	4	7	5	5	21
14	21241D2014	9	10	5	5	29
15	21241D2015	5	6	5	5	21
16	21241D2016	5	7	5	3	20
17	21241D2017	3	7	5	5	20
18	21241D2018	5	7	5	3	20
19	21241D2019	AB	6	5	4	15
20	21241D2020	5	2	5	3	15
21	21241D2021	5	2	5	3	15

Faculty Signature

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(8 Pages)

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. 30231

H.T. No.	2	1	2	4	1	0	2	0	1	4

Name of the Examination 1st year Mtech 1st Sem Lab Internal Exam

Course AC Lab Branch STE Date 19/3/2022

Signature of the Invigilator

START WRITING FROM HERE

14)

Objective: The objective of the Slump flow test is to determine the flowability of the self compacting concrete

Apparatus: Slump cone, Flow Measurement Board

Materials: Cement, Fine Aggregate, Coarse Aggregate, Fly Ash, Superplasticizer

Theory: Self Compacting concrete means no vibrations are used for compaction

IU & B

Procedure:

i) Take the mix proportions - ~~1:1.5:3~~

ii) ~~Add water~~ Take the coarse aggregate, fine aggregate, cement, i.e.

iii) Calculate the water content

iv) Prepare the concrete and fill it in the inverted slump cone without compaction. which is placed on the flow measurement b

v) After filling the concrete, remove the excess concrete and clean the flow measurement board.

vi) Now, remove the cone and allow the concrete to flow

vii) Measure the size of the slump flow with help of scale on the flow board.

Observations & Calculations:

Weight of cement = 1.3 kgs

weight of Fine Aggregate = ~~1.5kgs~~ 2.4 kgs

weight of coarse Aggregate = 4.8 kgs

weight of Fly ash = 1.5 kgs

water = 1.2 ltrs

8. Marsh Cone Test

Objective: To determine the dosage of the superplasticizer.

Apparatus: Marsh Cone Apparatus, Tray

Materials: Cement, water, Superplasticizers

Theory: Super Plasticizers are High range water reducers

→ Take 1 kgs of cement

→ Pour the cement in the tray

→ Take the water cement ratio and calculate water content of [illegible]

→ Pour 70% of water and mix the cement

→ Then add +/- 0.5% of superplasticizer to 1 kgs of cement with water

→ Now, pour the cement paste prepared in the cone with bottom of the cone closed with the finger. After finishing filling the cement paste remove the finger and allow it to flow and collect it in the bucket and stand for stopwatch

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Bachupally, Hyderabad-500090

M.Tech Structural Engg. I Yr-I Sem- GR20 2021 -22

Subject Name: ADVANCED CONCRETE LAB (REGULAR EXAMINATION) Date: 22.03.2022

ATTENDANCE SHEET

S.No	Reg No	Student Name	BOOKLET NO	QUESTION NO	SIGNATURE
1	21241D2001	ATKAPURAM PRASHANTH	127932	7,8	
2	21241D2002	BANDI SRI RAM GOPAL	127933	2,6	
3	21241D2003	CHALLA MADHAVI	127934	1,4	
4	21241D2004	PAMMI DIVYA	127935	9,4	
5	21241D2005	DUMMA UMESH KUMAR	127936	2,5	
6	21241D2006	K LATHASREE	127937	11,13	
7	21241D2007	MARIVALA VAISHNAVI	127938	12,13	
8	21241D2008	MAVOORI PRANAV	127939	2,10	
9	21241D2009	MITTAPALLI NAGA ASHWINI	127940	7,9	
10	21241D2010	R VENKATA SURAJ REDDY	127941	6,14	
11	21241D2011	REPATI MOHAN BABU	127942	11,10	
12	21241D2012	SANDHYA CHERUKU	127943	1,2	
13	21241D2013	SHAIK FEROZ	127944	3,6	
14	21241D2014	SK SAI CHANDRA	127945	14,8	
15	21241D2015	TIRTA HARSHAVARDHAN	127946	1,2	
16	21241D2016	VARIKUPPALA LALITHA	127947	8,11	
17	21241D2017	V RAMA GNANENDRA SAI	127948	11,14	
18	21241D2018	YENUMALA BEVESH GOUD	127949	2,14	
19	21241D2019	S PRASHANTH KUMAR			
20	21241D2020	B THARUN TEJA	127950	9,14	
21	21241D2021	G NITISH KUMAR	127951	2,14	

Internal Examiner

25/03/2022

EXTERNAL EXAMINER