



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

TRANSPORTATION ENGINEERING LAB

III-B.Tech – II Semester

V. RAMESH/ K.VEERABABU

Assistant Professor

Academic year: 2021-2022



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

TRANSPORTATION ENGINEERING 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 | |
| 12 | Evaluation Strategy | |
| 13 | Assessment in relation to COB's and CO's | |
| 14 | Rubric for course | |
| 15 | Mappings of CO's and PO's | |
| 16 | Model question papers | |
| 17 | Mid question papers | |
| 18 | Internal Marks | |
| 19 | Sample answer scripts and Assignments | |



GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY TRANSPORTATION ENGINEERING LAB

Course Code: GR18A3072

L:0 T:0 P:2 C:1

III Year. II Semester

Course Objectives: The objectives of this course is to make the student to

1. Provide knowledge of physical and mechanical characteristics of highway materials.
2. Demonstrate various experiments on highway materials to check their suitability in road construction.
3. Illustrate design methods and test procedures for strength determination of bituminous mixes.
4. Facilitate knowledge of optimum material selection for pavement layers.
5. Understand the behavior of the materials under vehicle load conditions.

Course Outcomes: After completion of this course, students will be able to

1. Estimate desired characteristics of aggregates.
2. Distinguish suitable materials for road construction.
3. Categorize pavement materials by their physical and mechanical properties.
4. Demonstrate various experiments on bitumen to measure various properties.
5. Demonstrate bituminous mixes as per pavement requirement.

List of experiments:

Task 1: TESTS ON AGGREGATES

1. Crushing value
2. Impact value
3. Specific gravity and water absorption
4. Abrasion test
5. Shape test.

Task 2: TESTS ON BITUMEN

1. Penetration test
2. Ductility test
3. Softening point test
4. Flash and fire point tests

Task 3: TESTS ON BITUMINOUS MIXES

1. Specific Gravity- Demonstration
2. Marshall stability test -Demonstration

TEXT/REFERENCE BOOKS:

1. Highway Engineering – S. K. Khanna & C. E. G. Justo. New Chand & Brothers.
2. Highway Material Testing - S. K. Khanna & C. E. G. Justo.



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

TIME TABLES (wef-17/01/2022)

III BTech - (GR 18) II Semester

AY: 2021-22

SEC: A

| DAY/ HOUR | 9:00-9:55 | 9:55-10:50 | 10:50-11:45 | 11:45-12:25 | 12:25-1:15 | 1:15-2:05 | 2:05-2:55 |
|-----------|-----------|------------|-------------|--------------------|---------------------|-----------|-----------|
| Monday | | | | Lunch Break | | | |
| Tuesday | | | | | TE LAB / MPS | | |
| Wednesday | | | | | | | |
| Thursday | | | | | | | |
| Friday | | | | | | | |
| Saturday | | | | | TE LAB / MPS | | |

III BTech - (GR 18) II Semester

AY: 2021-22

SEC: B

| DAY/ HOUR | 9:00-9:55 | 9:55-10:50 | 10:50-11:45 | 11:45-12:25 | 12:25-1:15 | 1:15-2:05 | 2:05-2:55 |
|-----------|---------------------|------------|-------------|--------------------|---------------------|-----------|-----------|
| Monday | | | | Lunch Break | | | |
| Tuesday | | | | | | | |
| Wednesday | | | | | | | |
| Thursday | | | | | TE LAB / MPS | | |
| Friday | | | | | | | |
| Saturday | TE LAB / MPS | | | | | | |

Programme Educational Objectives

1. Graduates of the programme will be successful in technical and professional career.
2. Graduates of the programme will have technical proficiency in solving real time Civil Engineering projects.
3. Graduates of the programme will continue to engage in life-long learning with ethical and social responsibility.

Programme Outcomes

Graduates of the Civil Engineering programme will be able to

- a. Apply knowledge of mathematics, science and fundamentals of Civil Engineering.
- b. Analyse problem and interpret the data.
- c. Design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
- d. Identify, formulate, analyze and interpret data to solve Civil Engineering problems.
- e. Use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
- f. Understand the impact of engineering solutions in a global, economic and societal context.
- g. Understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
- h. Understanding of professional and ethical responsibility.
- i. Work effectively as an individual or in a team and to function on multi-disciplinary context.
- j. Communicate effectively with engineering community and society.
- k. Demonstrate the management principles in Civil Engineering projects.
- l. Recognize the need for and an ability to engage in life-long learning.

Program Specific Outcomes

1. Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.
2. Create and develop innovative designs with new era materials through research and development.



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

COURSE OBJECTIVES

Academic Year : 2021-2022

Semester : II

Name of the Program : B.Tech **Year:** III Year **Section:** A&B

Course/Subject : Transportation Engineering Lab **Course Code:**

GR18A3072

Name of the Faculty: V. Ramesh/ K.Veerababu

Designation: Assistant Professor

Dept.: Civil Engineering

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

| S. No | Objectives |
|--------------|---|
| 1 | Provide knowledge of physical and mechanical characteristics of highway materials. |
| 2 | Demonstrate various experiments on highway materials to check their suitability in road construction. |
| 3 | Illustrate design methods and test procedures for strength determination of bituminous mixes. |
| 4 | Facilitate knowledge of optimum material selection for pavement layers. |
| 5 | Understand the behavior of the materials under vehicle load conditions |

Signature of HOD

Signature of faculty

Date:

Date:



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

COURSE OUTCOMES

Academic Year : 2021-2022

Semester : II

Name of the Program : B.Tech **Year:** III **Section:** A&B

Course/Subject : Transportation Engineering Lab **Course Code:** GR18A3072

Name of the Faculty : V. Ramesh/ K.Veerababu

Designation: Assistant Professor

Dept.: Civil Engineering

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

| S.No | Outcomes |
|------|--|
| 1 | Estimate desired characteristics of aggregates. |
| 2 | Distinguish suitable materials for road construction. |
| 3 | Categorize pavement materials by their physical and mechanical properties. |
| 4 | Demonstrate various experiments on bitumen to measure various properties. |
| 5 | Demonstrate bituminous mixes as per pavement requirement |

Signature of HOD

Signature of faculty

Date:

Date:



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

List of Students

Section-A

| S.No | Reg No | Student Name |
|-------------|---------------|--------------------------|
| 1 | 18241A0151 | SOHEB PATEL |
| 2 | 18241A0152 | SRIAM SHIVA ADITYA |
| 3 | 19241A0101 | RUHAIL AHMAD LONE |
| 4 | 19241A0102 | AITHA SAI TEJA |
| 5 | 19241A0103 | BARISSETTY SHIVA KARTHIK |
| 6 | 19241A0104 | BENDHI VARUN THEJA GOUD |
| 7 | 19241A0105 | BHUKYA VAMSHI |
| 8 | 19241A0106 | BOGE VENKAT ROHITH |
| 9 | 19241A0107 | BONTHA PRANEETHKUMAR |
| 10 | 19241A0108 | CHILUKA RAHUL |
| 11 | 19241A0109 | DANDI KIRAN |
| 12 | 19241A0110 | DAYYA RAGNESH |
| 13 | 19241A0111 | E MANISH GOUD |
| 14 | 19241A0112 | ERRAM SAI PRIYA |
| 15 | 19241A0113 | G DEEPIKA |
| 16 | 19241A0114 | GORANTALA SAI |
| 17 | 19241A0115 | GUGULOTHU SANTHOSH |
| 18 | 19241A0116 | GURIJALA SAI KUMAR |
| 19 | 19241A0117 | GURUJALA SRIDHAR |
| 20 | 19241A0118 | IRUVANTI HEMANTH KUMAR |
| 21 | 19241A0119 | JANGITI VYSHNAVI |
| 22 | 19241A0120 | JARUPLA CHERAN |
| 23 | 19241A0122 | JETTI SREEVANI |
| 24 | 19241A0123 | K SOWMYA |
| 25 | 19241A0124 | KADALI KRISHNASRI SAI |
| 26 | 19241A0125 | KAMAREDDY AKSHAY |
| 27 | 19241A0126 | KATTA SAI KUMAR |
| 28 | 19241A0127 | KOLLURI.TEJASWI |
| 29 | 19241A0128 | KONDAPURAM SRIJA |

| | | |
|----|------------|--------------------------------------|
| 30 | 19241A0129 | KOTTE VIVEK |
| 31 | 19241A0130 | KRUTHIKA VIJAY PALANGE |
| 32 | 19241A0131 | MADA AKHIL REDDY |
| 33 | 19241A0132 | MADARAM SHRAVAN KUMAR REDDY |
| 34 | 19241A0133 | MADDIGATLA AJAY SAGAR |
| 35 | 19241A0134 | CHANDANA MALPATEL |
| 36 | 19241A0135 | MANDALA CHINNI |
| 37 | 19241A0136 | MIREGILLA VIJAYAKUMAR |
| 38 | 19241A0137 | MOHD OBAID KASHIF |
| 39 | 19241A0138 | NARAPAKA MADHAV KUMAR |
| 40 | 19241A0139 | NIMMALA ARSHITHA |
| 41 | 19241A0141 | P SIDDARTHA |
| 42 | 19241A0142 | PAGIDIPALLY AJAY KUMAR |
| 43 | 19241A0143 | PALLAPU NAVEEN |
| 44 | 19241A0144 | PALLE SANATH KUMAR |
| 45 | 19241A0145 | PANTANGI PRANAY |
| 46 | 19241A0146 | PATIL SWAPNIL |
| 47 | 19241A0147 | POLISSETTY SAAHAS |
| 48 | 19241A0148 | S.SAITEJA |
| 49 | 19241A0149 | SAI NEERAJ M |
| 50 | 19241A0150 | SATYA SAI PRASANNA REDDY SOLIPETA |
| 51 | 19241A0151 | SHAIK BILAL |
| 52 | 19241A0152 | SHAIK FIRDOUS AYESHA |
| 53 | 19241A0153 | SOORA VIKAS |
| 54 | 19241A0154 | TELLAM SRI SAI PAVANA ROSHINI |
| 55 | 19241A0155 | THALLAPALLY SWARANYA |
| 56 | 19241A0156 | THUMATI VENKATA VAYUNANDHAN |
| 57 | 19241A0157 | UDUMULA NIKHIL REDDY |
| 58 | 19241A0158 | VELISHALA GAYATHRI |
| 59 | 19241A0159 | VENKATA SIDDHARTHA RAJU VEGESNA |
| 60 | 19241A0160 | YASWANTH KURUVA |

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

Section-B

| S.No | Reg No | Student Name |
|-------------|---------------|------------------------------|
| 1 | 19241A0161 | ABDUL RAHEEM |
| 2 | 19241A0162 | ANEMONI MURALI MANOHAR |
| 3 | 19241A0163 | ASKANY HARISH SAGAR |
| 4 | 19241A0164 | BODLA AKSHITH |
| 5 | 19241A0165 | BURRA VAMSHI KRISHNA |
| 6 | 19241A0166 | CHERLAKOLA AKHILA |
| 7 | 19241A0167 | CHINTAPALLI VIKRAM |
| 8 | 19241A0168 | CHIRRIBOYINA DHANYA |
| 9 | 19241A0169 | D SREE MADHURI |
| 10 | 19241A0170 | GADDAM SAHITHI |
| 11 | 19241A0171 | GAJJALA SUKENDHAR REDDY |
| 12 | 19241A0172 | YASHASWI GANGAVARAM |
| 13 | 19241A0173 | GINDHAM ADITYA KUMAR |
| 14 | 19241A0174 | GUDHETI NARENDAR REDDY |
| 15 | 19241A0175 | GUMMADI SAI PRATEEK REDDY |
| 16 | 19241A0176 | HANMAPUR DHEERAJ GOUD |
| 17 | 19241A0177 | JAVVAJI AISHWARYA |
| 18 | 19241A0178 | JULAPALLY NITHIN RAO |
| 19 | 19241A0179 | K NAVEEN |
| 20 | 19241A0180 | K RAJESHWARI |
| 21 | 19241A0181 | KACHAVA SURENDAR |
| 22 | 19241A0182 | KODATHALA INDU |
| 23 | 19241A0183 | KOTARU SRINIVASA VARAPRASAD |
| 24 | 19241A0184 | MALOTH RAHUL |
| 25 | 19241A0185 | MATURI SATHVIK |
| 26 | 19241A0186 | MD ABDUL MAAJID |
| 27 | 19241A0187 | MEDARI DAYANA |
| 28 | 19241A0188 | NARSINGA SANDEEP |
| 29 | 19241A0189 | PALANATI ROHITH |
| 30 | 19241A0190 | PURALASETTY BHAVANA |
| 31 | 19241A0191 | RODDA MALAVIKA REDDY |
| 32 | 19241A0192 | SAPRAM NAGA SRILOWKYA MUKTHA |

| | | |
|----|------------|----------------------------|
| 33 | 19241A0193 | SHAIK PARVEZ ANSARI |
| 34 | 19241A0194 | SIDDELA THARUN KUMAR |
| 35 | 19241A0195 | TALARI CHANDANA SREE |
| 36 | 19241A0196 | VALLEPU KALYAN |
| 37 | 19241A0197 | VRASHAB PATEL |
| 38 | 19241A0198 | YELLAVULA NARENDER |
| 39 | 19241A0199 | BADDELA SAI THARUN |
| 40 | 20245A0101 | Aamanchi Bowmi |
| 41 | 20245A0102 | Aviraboina Sai Chaithanya |
| 42 | 20245A0103 | Bairy B S Anirudh |
| 43 | 20245A0104 | Daddu Tejasree |
| 44 | 20245A0105 | Dopathi Raviteja |
| 45 | 20245A0106 | Eruventi Niharika |
| 46 | 20245A0107 | Gaddamidi Aanil |
| 47 | 20245A0108 | Gandla Rishik Raj |
| 48 | 20245A0109 | Gone Naveen Kumar |
| 49 | 20245A0110 | Kota Vishal |
| 50 | 20245A0111 | Kummari Mahesh |
| 51 | 20245A0112 | Lakavath Anil |
| 52 | 20245A0113 | Madavaram Rohith |
| 53 | 20245A0114 | Mandala Akshitha |
| 54 | 20245A0115 | M Manjunath |
| 55 | 20245A0116 | Porandla Nagabhushanam |
| 56 | 20245A0117 | Pulishetty Bhavani |
| 57 | 20245A0118 | Racha Kranthi Ranadeer |
| 58 | 20245A0119 | S Manoj Kumar |
| 59 | 20245A0120 | Samudrala Manideep |
| 60 | 20245A0121 | Sangepaga Goutham |
| 61 | 20245A0122 | Sodadasi Rahul |
| 62 | 20245A0123 | Vanga Harshith |
| 63 | 20245A0124 | Choleti Vineetha |
| 64 | 20245A0125 | Gangula Grishma |
| 65 | 20245A0126 | Bollampalli Sai Poojith |
| 66 | 20245A0127 | Pamulapati Sumanth |
| 67 | 20245A0128 | T Sanghamithra |
| 68 | 20245A0129 | Ambeda Akanksha |
| 69 | 20245A0130 | Doppalapudi Ramvineeth Sai |
| 70 | 20245A0131 | Pilly Uday Kiran |



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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

COURSE COMPLETION STATUS

Academic Year : 2021-2022
Semester : II
Name of the Program : B.Tech Year: III Section: A
Course/Subject : Transportation Engineering Lab,
CourseCode:GR 15A3014
Name of the Faculty : V Ramesh/A Vittalaiah Dept.: Civil Engineering
Designation : ASST.PROFESSOR

Actual Date of Completion & Remarks, if any

| Units | Remarks | No. of Objectives Achieved | No. of Outcomes Achieved |
|---------|---|----------------------------|--------------------------|
| Cycle 1 | 12/03/2022, with in the plans schedule is completed | 1,4,5 | 2,4 |
| Cycle 2 | 14/05/2022, with in the plans schedule is completed | 1,2,3,4,5 | 2,4,5 |

Signature of HOD

Signature of faculty

Date:

Date:

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



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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

COURSE COMPLETION STATUS

Academic Year : 2021-2022
Semester : I
Name of the Program : B.Tech Year: III Section: B
Course/Subject : Transportation Engineering Lab
Course Code: GR18A3072
Name of the Faculty :K.Veerababu/T.Jahnavi Dept.: Civil Engineering
Designation : ASST.PROFESSOR

Actual Date of Completion & Remarks, if any

| Units | Remarks | No. of Objectives Achieved | No. of Outcomes Achieved |
|---------|--|----------------------------|--------------------------|
| Cycle 1 | Within the plans schedule is completed | 1,4,5 | 2,4 |
| Cycle 2 | Within the plans schedule is completed | 1,2,3,4,5 | 2,4,5 |

Signature of HOD

Signature of faculty

Date:

Date:

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



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

COURSE SCHEDULE

Academic Year : 2021-2022

Semester : II

Name of the Program: B. Tech Year: III Section: A

Course/Subject: Transportation Engineering Laboratory Course Code: **GR18A3072**

Name of the Faculty: V. Ramesh/ A Vittalaiah Dept.: Civil Engineering

Designation: ASST.PROFESSOR.

The Schedule for the whole Course / Subject is:

| S. No. | Description | Duration (Date) | | Total No. Of Periods |
|--------|---------------------------------|-----------------|------------|----------------------|
| | | From | To | |
| 1. | Cycle-I: Tests on AGGREGATES | 17/01/2022 | 12/03/2022 | 13 |
| 2. | Cycle-II: Tests on BITUMEN | 17/03/2022 | 14/05/2022 | 13 |

Total No. of Instructional periods available for the course: 26

Signature of HOD

Signature of faculty

Date:

Date:

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND
TECHNOLOGY**

DEPARTMENT OF CIVIL ENGINEERING (2021-2022)

**Subject: Transportation Engineering Lab
(Section – A)**

Class: B.Tech., III/II

Name : V. Ramesh/ A Vittalaiah

Sub Code: GR18A3072

| S. No | Date | EXPERIMENTS |
|-------------------------------------|-------------|---|
| 1 | 18/01/2022 | Introduction |
| Cycle-1: Tests on Aggregates | | |
| 2 | 22/01/2022 | Aggregate Crushing strength test |
| 3 | 25/01/2022 | Aggregate Impact Test |
| 4 | 29/01/2022 | Aggregate Abrasion test |
| 5 | 01/02/2022 | Aggregate Flakiness Index |
| 6 | 05/02/2022 | Aggregate Elongation Index |
| 7 | 08/02/2022 | Aggregate Specific Gravity Test |
| 8 | 12/02/2022 | Revision - Aggregate Crushing strength test |
| 9 | 15/02/2022 | Revision - Aggregate Impact Test |
| 10 | 19/02/2022 | Revision - Aggregate Abrasion test |
| 11 | 22/02/2022 | Revision - Aggregate Flakiness Index |
| 12 | 26/02/2022 | Revision - Aggregate Elongation Index |
| 13 | 05/03/2022 | Revision - Aggregate Specific Gravity Test |
| Cycle-II: Tests on Bitumen | | |
| 14 | 08/03/2022 | Penetration Test |
| 15 | 12/03/2022 | Ductility Test |
| 16 | 19/03/2022 | Softening point of Bitumen |

| | | |
|---|------------|---------------------------------------|
| 17 | 22/03/2022 | Flash and Fire point test |
| 18 | 26/03/2022 | Revision - Penetration Test |
| 19 | 29/03/2022 | Revision - Ductility Test |
| 20 | 05/04/2022 | Revision - Softening point of Bitumen |
| 21 | 09/04/2022 | Revision - Flash and Fire point test |
| Cycle-III: Demonstration Experiments on Bituminous Mixes | | |
| 22 | 12/04/2022 | Specific Gravity |
| 23 | 16/04/2022 | Marshall Stability test |
| 24 | 19/04/2022 | Revision - Specific Gravity |
| 25 | 23/04/2022 | Revision - Marshall Stability test |
| 26 | 26/04/2022 | Revision - Cycle I |
| 27 | 30/04/2022 | Revision - Cycle II |
| 28 | 07/05/2022 | Revision - Cycle III |
| 29 | 10/05/2022 | Lab Internal Exam |



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND
TECHNOLOGY**

DEPARTMENT OF CIVIL ENGINEERING (2021-2022)

**Subject: Transportation Engineering Lab
III/II (Section – B)**

Class : B.Tech.,

Name : K.Veerababu/T. Jahnavi

Sub Code: GR18A3072

COURSE SCHEDULE

Academic Year : 2021-2022

Semester : II

Name of the Program: B. Tech

Year: III

Section: B

Course/Subject: Transportation Engineering Laboratory

Course Code: **GR18A3072**

Name of the Faculty: V. Ramesh/ K.Veerababu

Dept.: Civil Engineering

Designation: ASST.PROFESSOR.

The Schedule for the whole Course / Subject is:

| S. No. | Description | Duration (Date) | | Total No. Of Periods |
|--------|-----------------------|-----------------|------------|----------------------------|
| | | From | To | |
| 1. | Unit I: AGGREGATES | 08/03/2021 | 01/05/2021 | 15 |
| 2. | Unit II: BITUMEN | 31/05/2021 | 10/07/2021 | 15 |

Total No. of Instructional periods available for the course: 30

Signature of HOD

Signature of faculty

Date:

Date:

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND
TECHNOLOGY**

DEPARTMENT OF CIVIL ENGINEERING (2021-2022)

**Subject: Transportation Engineering Lab
III/II (Section – B)**

Class : B.Tech.,

Batch-B1

Name : K.Veerababu/ T Jahnavi

Sub Code: GR18A3072

| Lesson No. | Date | No. of Periods | Topics / Sub-Topics |
|-------------------|-------------|-----------------------|--|
| 1 | 09/03/2021 | 3 | INTRODUCTION/DEMONSTRATION OF HM LAB EXP |
| 2 | 16/03/2021 | 3 | Aggregate crushing test |
| 3 | 18/03/2021 | 3 | Aggregate impact test |
| 4 | 23/03/2021 | 3 | Aggregate abrasion test |
| 5 | 25/03/2021 | 3 | Aggregate shape test |
| 6 | 30/03/2021 | 3 | specific gravity test |
| 7 | 01/04/2021 | 3 | REVISION ON CYCLE I EXPERIMENTS |
| 8 | 06/04/2021 | 3 | Bitumen penetration test |
| 9 | 08/04/2021 | 3 | Bitumen softening point test |
| 10 | 13/04/2021 | 3 | Bitumen ductility test |
| 11 | 15/04/2021 | 3 | Flash and fire point test |
| 12 | 20/04/2021 | 3 | specific gravity |
| 13 | 22/04/2021 | 3 | Marshals stability test |

| | | | |
|----|------------|---|----------------------------------|
| 14 | 27/04/2021 | 3 | REVISION ON CYCLE I EXPERIMENTS |
| 15 | 29/04/2021 | 3 | REVISION ON CYCLE II EXPERIMENTS |

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND
TECHNOLOGY**

DEPARTMENT OF CIVIL ENGINEERING (2021-2022)

**Subject: Transportation Engineering Lab
(Section – B)**

Class : B.Tech., III/II

Batch-B2

Name: V. Ramesh/ K.Veerababu

Sub Code:GR18A3072

| Lesson No. | Date | No. of Periods | Topics / Sub-Topics |
|-------------------|-------------|-----------------------|---------------------------------|
| 1 | 22/01/2022 | 3 | INTRODUCTION/DEMONSTRATION |
| 2 | 29/01/2022 | 3 | Aggregate crushing test |
| 3 | 05/02/2022 | 3 | Aggregate impact test |
| 4 | 12/02/2022 | 3 | Aggregate abrasion test |
| 5 | 19/02/2022 | 3 | Aggregate shape test |
| 6 | 26/02/2022 | 3 | specific gravity test |
| 7 | 05/03/2022 | 3 | REVISION ON CYCLE I EXPERIMENTS |
| 8 | 12/03/2022 | 3 | Bitumen penetration test |
| 9 | 26/03/2022 | 3 | Bitumen softening point test |
| 10 | 02/04/2022 | 3 | Bitumen ductility test |
| 11 | 09/04/2022 | 3 | Flash and fire point test |
| 12 | 16/04/2022 | 3 | specific gravity |



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

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

| | | | |
|----|------------|---|-------------------------|
| 13 | 23/04/2022 | 3 | Marshals stability test |
| 14 | 30/04/2022 | 3 | Revision |
| 15 | 07/05/2022 | 3 | Lab Internal Exam |

**SCHEDULE OF INSTRUCTIONS
UNIT PLAN**

Academic Year : 2021-2022
Semester : I UNIT NO.: I
Name of the Program : B.Tech Civil Engineering Year: III Section: A
Course/Subject : Transportation Engineering Lab
Course Code: GR18A3072
Name of the Faculty :V. Ramesh/A Vittalaiah Dept.: Civil Engineering
Designation : ASST.PROFESSOR

| Lesson No. | Date | No. of Periods | Topics / Sub – Topics | Objectives & Outcomes Nos. | Knowledge Level | References (Text Book, Journal...) Page Nos.: ____to ____ |
|------------|------------|----------------|--|----------------------------|-----------------|--|
| 1. | 18/01/2022 | 8 | INTRODUCTION/DEMONSTRATION OF HM LAB EXP | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011). |
| 2. | 22/01/2022 | 8 | Aggregate crushing test | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011). |
| 3. | 25/01/2022 | 8 | Aggregate impact test | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011). |

| | | | | | | |
|----|------------|---|-------------------------|-------------------|----|---|
| 4. | 29/01/2022 | 8 | Aggregate abrasion test | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Ju sto, Nemchand& Bros., 9th edition (2011). |
| 5. | 01/02/2022 | 8 | Aggregate shape test | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Ju sto, Nemchand& Bros., 9th edition (2011). |
| 6. | 08/02/2022 | 8 | specific gravity test | 1,4,5 & 2,4 | K4 | S.K.Khanna&C.E.G.Ju sto, Nemchand& Bros., 9th edition (2011). |

Signature of HOD

Date:

Signature of faculty

Date:



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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

SCHEDULE OF INSTRUCTIONS UNIT PLAN

Academic Year : 2021-2022
Semester : I UNIT NO.: II
Name of the Program : B.Tech Civil Engineering Year: III Section: A
Course/Subject : Transportation Engineering Lab
Course Code: GR18A3072
Name of the Faculty : V. Ramesh/A Vittalaiah Dept.: Civil Engineering
Designation : ASST.PROFESSOR

| Less on No. | Date | No. of Periods | Topics / Sub – Topics | Objectives & Outcomes Nos. | Knowledge Level | References (Text Book, Journal...) Page Nos.: ____to ____ |
|-------------|------------|----------------|------------------------------|----------------------------|-----------------|---|
| 1 | 08/03/2022 | 8 | Bitumen penetration test | 1,2,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition (2011). |
| 2 | 19/03/2022 | 8 | Bitumen softening point test | 1,2,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition (2011). |

| | | | | | | |
|---|------------|---|---------------------------|-------|----|---|
| 3 | 12/03/2022 | 8 | Bitumen ductility test | 3,4,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition |
| 4 | 22/03/2022 | 8 | Flash and fire point test | 3,4,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition |
| 5 | 22/03/2022 | 8 | Flash and fire point test | 3,4,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition |
| 6 | 12/04/2022 | 8 | specific gravity | 4,5 | K4 | S.K.Khanna&C.E.G. Justo, Nemchand& Bros., 9th edition (2011). |

Signature of HOD

Signature of faculty

Date:

Date:

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED IN BOLD
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC

**Gokaraju Rangaraju Institute of Engineering and
Technology (Autonomous)**

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

EVALUATION STRATEGY

Academic Year : 2021-2022

Semester : II

Name of the Program: B.Tech

Year: III

Section: A & B

Course/Subject: Transportation Engineering Lab

Course Code: **GR18A3072**

Name of the Faculty: V. Ramesh/ K.Veerababu

Dept.: Civil Engineering

Designation: ASST.PROFESSOR

1. TARGET:

A) Percentage for pass: 100%

b) Percentage of class:85%

Total Strength of the class: 133

| S. NO | Class / Division | No. of Students |
|-------|--------------------------------------|-----------------|
| a. | First class with Distinction(SGPA>7) | 101 |
| b. | First Class(SGPA-6) | 13 |
| c. | Pass Class(SGPA 5-4) | 19 |

2. COURSE PLAN& CONTENT DELIVERY

| S.No | Plan | Brief Description |
|------|----------------------------|---|
| a. | Practice Classes | 64 classes for A section, 64 classes for B (including lecture classes) |
| b. | Design of Lecture Classes | <p>Detailed lecture on Aggregates and Bitumen. Explanation on aggregate sieving, separation, bitumen heating and placing it in moulds, etc using examples.</p> <p>Explanation for finding the engineering properties of aggregates like strength, toughness, durability, hardness etc.</p> <p>Explanation given to find the grade of bitumen, its softening point, ductility, flash and fire point , bituminous mix design etc.</p> |
| c. | Design of Practice Classes | Exercises in each module are practiced based on real time projects meeting industrial standards. |
| d. | Presentations | <p>Presentations on topics like</p> <ol style="list-style-type: none"> 1) Sieving 2) Grading 3) testing 4) Presentations and video tutorial on bitumen heating, pouring, testing. |
| e. | Assignments | Assignments are designed more on finding out different objects in Total Station |

| | | |
|----|---------------|--|
| f. | Demonstration | Selecting suitable aggregate and bitumen grade for real time projects. |
|----|---------------|--|

(Please write how you intend to cover the contents: i.e., coverage of Units/Lessons by lectures, design, exercises, solving numerical problems, demonstration of models, model preparation, experiments in the Lab., or by assignments, etc.)

3. METHOD OF EVALUATION

3.1 Continuous Assessment Examinations (CAE-I, CAE-II)

- A. Assignments:** Assignments on testing of different types of aggregates, sizes of aggregates, sieving of aggregates. Finding gradation for different sizes of aggregates. Focusing on assessing their knowledge on finding the strength, toughness, durability, hardness of aggregates. Finding different grades of bitumen and its properties.
- B. Practical Projects:** Assessing the skills of the students in applying their knowledge to practical application.
- C. Viva:** Assessing the overall knowledge of the student in highway materials.
- D. Internal Examination:** Internal Examination to assess their overall knowledge on Aggregates and Bitumen.

3.2 Semester/End Examinations: To test their abilities in testing of aggregates and bitumen and to approve their abilities learnt during lab sessions.

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

.....

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

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

GUIDELINES TO STUDY THE COURSE / SUBJECT

| | | |
|------------------------|---|--|
| Academic Year | : | 2021-2022 |
| Semester | : | I |
| Name of the Program | : | B.Tech Civil Engineering Year: III Section: A & B |
| Course/Subject | : | Transportation Engineering Lab |
| Course Code: GR18A3072 | | |
| Name of the Faculty | : | V. Ramesh/K.Veerababu Dept.: Civil Engineering |
| Designation | : | ASST.PROFESSOR |

Guidelines to study the Course/ Subject: Transportation Engineering Lab

This course helps students to practically learn and understand physical properties of highway materials like aggregates, bitumen and their mixes

So the students should have the following prerequisites

- Understand the constituents of Bitumen, manufacture of Bitumen and its properties.
- Understand and know tests on physical properties of aggregates and different grades of bitumen.
- Understand tests on Bitumen aggregate Mix.
- Knowledge of Highway materials.

Practicing these experimental procedure for this course will make the students to undertake the real time projects and there by the student can be industry ready to get hired I to various industries.

Where will this subject help?

This course one of the requirement in the following areas.

Useful in construction field as a site engineer.

Ready mix plant.

Quality check of the Highway materials.

In developing new Highway materials.

It is prerequisite for the construction technology & planning management.

Books / Materials

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011).
2. Railway Engineering – A text book of Transportation Engineering – S.P.Chandola – S.Chand& Co. Ltd. – (2001).
3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
4. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

REFERENCES:

1. Highway Engineering – S.P.Bindra ,DhanpatRai& Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 8th Edition – 2011.
3. Railway Engineering –Prabha& Co., 15th Edition – August 1994.
4. Air Transportation Planning & design – Virendhra Kumar &StatishChandhra – Gal Gotia Publishers (1999).

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:

Assessments in Relation to CO's

Assessments:

- 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 | 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 |

Assessments in Relation to COB's

Assessments:

- 1) ASSIGNMENT
- 2) INTERNAL EXAMINATION
- 3) EXTERNAL EXAMINATION

- 4) PRACTICAL PROJECTS
- 5) VIVA

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



**GokarajuRangaraju Institute of Engineering and
Technology (Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

RUBRIC TEMPLATE-

Academic Year: 2021-2022

Semester : III / II

Name of the Program: B.Tech

Year: III

Section: A

Course/Subject: Transportation Engineering Lab
GR18A3072

Course Code:

Name of the Faculty: V. Ramesh/ K.Veerababu

Dept.: Civil Engineering

Designation: ASST.PROFESSOR

| | | Beginning | Developin g | Reflecting Developme nt | Accomplish ed | Exemplary | Score (Numerica l) |
|------------------------|--|---|--|--|--|--|--------------------------|
| Name of the student | Performan ce Criteria | 1 | 2 | 3 | 4 | 5 | |
| | The level of knowledge on sieving, grading and compactin g of aggregates | Low level of knowledge on sieving, grading and compacting of aggregates. | Able to understand sieving, grading and compactin g of aggregates | Ability to explain on sieving, grading and compacting of aggregates. | Full knowledge on sieving, grading and compacting of aggregates. | Analyzing and application of knowledge on sieving, grading and compactin g of aggregates | 4 |

| | | | | | | | |
|--|---|--|--|---|---|---|---|
| | The level of knowledge on bitumen, its heating temperature, placing it in moulds and cooling temperature. | Low level of Knowledge on bitumen, its heating temperature, placing it in moulds and cooling temperature. | Able to understand Knowledge on bitumen, and its heating temperature, placing it in moulds and cooling temperature. | Ability to apply knowledge in the selection of good and suitable materials for pavement construction. | Full knowledge on bitumen, and its heating temperature, placing it in moulds and cooling temperature. | Analyzing all practical aspects of selecting various types of bitumen for construction and mix designs. | 5 |
| | The level of knowledge in obtaining the engineering properties of aggregates like strength, toughness, hardness, durability and properties of bitumen like grade, ductility, softening point. | Low level of knowledge in obtaining the engineering properties of aggregates like strength, toughness, hardness, durability and properties of bitumen like grade, ductility, softening point | Able to understand in obtaining the engineering properties of aggregates like strength, toughness, hardness, durability and properties of bitumen like grade, ductility, softening point | Ability to apply knowledge in the selection of good and suitable materials for pavement construction. | Full knowledge on obtaining the engineering properties of aggregates like strength, toughness, hardness, durability and properties of bitumen like grade, ductility, softening point. | Analyzing all practical aspects in pavement construction using different types of aggregates and bitumen depending on their engineering properties. | 4 |

| | | | | | | | |
|--|--|---|---|---|--|--|---|
| | The level of knowledge on application of aggregates and bitumen in different designing and construction of pavements | Low level of knowledge on application of aggregates and bitumen in different designing and construction of pavements. | Able to understand application of aggregates and bitumen in different designing and construction of pavements | Ability to apply knowledge in application of aggregates and bitumen in different designing and construction of pavements. | Full knowledge of aggregates and bitumen in different designing and construction of pavements. | Analyzing the selection of aggregates and mix design of bitumen. | 4 |
| | | | | Average | | | 4 |

MAPPINGS OF COBs, Cos Vs POs, POBs

Course Objectives-Course Outcomes Relationship Matrix

| Course- Objectives \ Course- Outcomes | 1 | 2 | 3 | 4 | 5 |
|---------------------------------------|---|---|---|---|---|
| 1 | x | x | | x | x |
| 2 | | | X | x | X |
| 3 | x | x | X | x | X |
| 4 | | | | x | |

Course outcomes-program outcomes relation (contributes: High, Medium and Low)

| Transportation Engineering Lab | a | b | c | d | e | f | g | H | I | j | K | l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Estimate desired characteristics of aggregates. | M | M | | M | | M | | H | | | | |
| 2.Distinguish suitable materials for road construction. | | M | M | H | | | | | | | | |
| 3.Categorize pavement materials by their physical and | | | | H | | | | | M | | | |

| | | | | | | | | | | | | |
|----------|----------|----------|----------|--|----------|----------|--|----------|----------|----------|----------|----------|
| | | | | | | | | | | | | |
| 1 | x | x | x | | x | | | | | | x | x |
| 2 | | x | | | | x | | X | | | | x |
| 3 | | | x | | x | x | | X | x | X | x | x |
| 4 | x | x | | | x | | | | | | x | x |
| 5 | x | x | x | | x | | | x | | X | x | x |

Courses (with title and code) - Program Outcomes (POs) Relationship Matrix

Course: Transportation Engineering Lab

| | | | | | | | | | | | | |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| P-Outcomes | a | b | c | d | e | f | g | h | i | j | k | l |
| C-Outcomes | | | | | | | | | | | | |
| 1 | x | x | | x | x | | | x | | | x | x |

Program Educational Objectives (PEOs)- Course Outcomes Relationship Matrix

| | | | | |
|------------------------|----------------------------|----------|----------|----------|
| | P-Objectives (PEOs) | 1 | 2 | 3 |
| Course-Outcomes | | | | |
| | 1 | x | X | X |
| | 2 | | X | |

| | | | |
|----------|----------|----------|----------|
| 3 | x | x | X |
| 4 | | x | X |
| 5 | | x | X |

Assessments in Program Outcomes (POs) Relationship Matrix

Assessments:

- 1) ASSIGNMENT
- 2) INTERNAL EXAMINATION
- 3) EXTERNAL EXAMINATION
- 4) PRACTICAL PROJECTS
- 5) VIVA

| P-Outcomes | a | b | c | d | e | f | g | h | I | j | k | l |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Assessments | | | | | | | | | | | | |
| 1 | x | x | x | | x | | | | | | x | x |
| 2 | x | x | x | | x | | | | | | x | x |
| 3 | | x | x | | x | | | | | | x | x |
| 4 | x | x | x | x | x | x | x | x | X | x | x | x |
| 5 | | x | x | | x | | x | | | | x | x |

Assessments in Program Educational Objectives (PEOs) Relationship Matrix

Assessments:

- 1) ASSIGNMENT
- 2) INTERNAL EXAMINATION
- 3) EXTERNAL EXAMINATION
- 4) PRACTICAL PROJECTS
- 5) VIVA

| | | | | |
|--------------------|---------------|----------|----------|----------|
| Assessments | (PEOs) | 1 | 2 | 3 |
| | 1 | x | x | X |
| | 2 | x | | |
| | 3 | x | | |
| | 4 | x | x | X |
| | 5 | x | x | X |

Constituencies- Program Outcomes (POs) Relationship Matrix

Constituencies:

- 1) Industry
- 2) Management
- 3) Students
- 4) Parents

| | | | | | | | | | | | | |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| P-Outcomes | a | b | c | d | e | f | g | h | I | j | k | l |
| Contituencies | | | | | | | | | | | | |
| 1 | x | x | x | x | x | x | x | x | X | x | x | x |
| 2 | | | x | | x | x | x | x | | | x | |
| 3 | x | x | x | x | x | | | x | | | x | x |
| 4 | | | x | x | | x | x | x | x | x | | |

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

Transportation Engineering Lab

Internal/External Examination Model Question Paper

1. a) Experimentally determine the toughness value of the given aggregate sample.
b) Explain the procedure involved in determining the flash and fire point of a bitumen sample.

2. a) Examine the strength of the given aggregate sample.
b) Explain the procedure involved in determining the Ductility value of a given bitumen sample.

3. a) Determine the hardness of the given sample of aggregates.
b) Mention the procedure for finding out the softening point of a given bitumen sample.

4. a) Examine and determine the specific gravity value for the given aggregate sample.
b) Write down the procedure involved in determining the penetration value of bitumen.

5. a) Determine the Elongation Index of the given aggregate sample.
b) Explain the step by step procedure involved for finding the specific gravity value of Bituminous Mix sample.

6. a) Examine the Flakiness Index value of the given aggregate sample.
b) Explain the procedure involved in finding the stripping value of given Bituminous Mix sample.

7. a) Determine the hardness of the given sample of aggregates.
b). Explain the procedure involved in determining the Ductility value of a given bitumen sample

8. a) Determine the strength of the given aggregate sample.

- b) Explain the procedure involved in finding the softening point of a bitumen sample.
9. a) Determine the toughness value of the given aggregate sample.
b) Write down the step by step procedure involve in determining the ductility value of a bitumen.
10. a) Determine the Elongation Index of the given aggregate sample.
b) Explain the procedure involved in finding the Flash and fire point of a given bitumen sample.
11. a) Examine the Flakiness Index of the given aggregate sample.
b) Write down the procedure involved in finding out the penetration value of the given bitumen.
12. a) Determine the Elongation Index of the given aggregate sample.
b) Explain the step by step procedure involved for finding the specific gravity value of Bituminous Mix sample.
13. a) Examine the Flakiness Index value of the given aggregate sample.
b) Explain the procedure involved in finding the stripping value of given Bituminous Mix sample.
14. a) Determine the strength of the given aggregate sample.
b) Explain the procedure involved in determining the Ductility value of a given bitumen sample.
15. a) Determine the temperature of the given bitumen sample to justify its use at a location having a maximum summer temperature of 48° C

b) Write down the procedure involved in determining the optimum binder content using Marshalls apparatus.
16. a) Experimentally determine the grade of a given bitumen sample.
b) Explain the procedure involved in determining the hardness of a given aggregate sample.



PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No.

3344

H.T. No.

1 9 2 4 1 A 0 1 7 0

Name of the Examination

IIIrd B.Tech TE LAB Internal.

Course

Transportation Engineering

Branch

CIVIL

Date

7/05/20

LAB.

Signature of the Invigilator

START WRITING FROM HERE

9

8.

a) Aim :- To Determine the Ductility value of a given bitumen Sample.

Apparatus :- Braquett mould, Ductility Machine with water Bath, pulling device; At precalibrate Rate, ~~putty~~ thermometer, Bitumen Sample is

procedure :-

→ Bitumen Sample is poured in the mould assembly and placed on Brass plate. where glycerin or Soap Solution

is applied to all surfaces exposed to Bitumen

→ A Sample is removed from the water Bath at 27°C and Excess Bitumen is cutoff by leveling the Surface using hot knife

→ After Trimming, the mould Assembly Containing Sample is replaced in water Bath ~~at~~ -27°C for 85-95 minutes

→ Then the sizes of moulds are Removed and the clips are Carefully booked on the machine without Causing any internal strain

→ Two or more moulds are prepared and Clipped to the machine to conduct this tests Simultaneously

8. a) Experimentally determining the Ductility value of a given bitumen sample

b) Explain the procedure involved in finding toughness value of the given aggregate sample..

→ pointer is set to zero. Thus Machine is started, thus clips are pulled horizontally

→ while test is in ~~compression~~, operation, you make sure that the specimen is immersed in the water by atleast 10mm

→ The distance at which horizontal ~~clip~~^{thread} of a specimen breaks is recorded.

Observations & calculations :-

| Test property | Trail 1 | Trail 2. | Mean Value |
|-----------------------|---------|---------------|------------|
| Ductility Test Length | 73 | 64 | 68.5 |

$$\text{Mean value} = \frac{73+64}{2} = 68.5$$

Result :- The ductility value of the given sample is. 68.5 cm

Conclusion :- The ductility value of Bitumen should be minimum of 75cm. Less than 75cm is brittle in nature and not suitable for pavement construction.

Since our value is 68.5cm which is not suitable for pavement construction.



8

b) procedure involved in finding toughness value of the given Aggregate Sample.

→ The test sample consists of Aggregates passing 12.5mm Sieve & retained on 10mm Sieve and dried in an oven for 4 hours at a temperature of 100°C to 110°C

→ The Aggregates are filled up to $\frac{1}{3}$ full in the cylindrical measure & tamped 25 times with rounded end of the tamping rod.

→ The rest of the cylindrical measure is filled by two layers & each layer being tamped 25 times.

→ The overflow of Aggregates in cylindrical measure is cut off by tamping rod using it has straight edge.

- Then the entire Aggregate in a measuring cylinder is weighed nearing to 0.0 gm
- The Aggregates from the cylindrical measure are carefully transferred into the cup which is finally fixed in position on the base plate of machine. Then it is tamped 25 times.
- The hammer is raised until its lower face is 38 cm above the upper surface of Aggregates in the cup & Allowed to fall freely on the Aggregates. The test sample is subjected to a total of 15 such blows each being delivered at an interval of not less than one second.
- The crushed Aggregate is then removed from the cup & the whole of it is

Sieved on 2.36mm sieve until its weighed

Repeat the above steps with fresh sample

→ Let the original weight of oven dry sample be w_1 gm & the weight of fraction passing 2.36mm I.S Sieve be w_2 gm. The Aggregate.

Impact value is expressed as the % of fines formed in terms of the total weight of sample.

$$\text{Aggregate Impact value} = \frac{100 \times w_2}{w_1} \%$$

✓ 7.2