

Name of the Faculty: Chinmaya Maharana (Guest Faculty)

Subject: TRANSPORTATION ENGINEERING LAB (PR:1)

Course Code: CEPC 211 | Program: Diploma In Civil Engineering | Semester: 3rd

Total Contact Hours: 60 Hrs (Practical) | Total Marks: 50

Assessment: Progressive – 35, End Term – 15 | Credits: 2

COURSE OUTCOMES:

CO1: Identify the types of roads as per IRC recommendations.

CO2: Implement the geometrical design features of different highways.

CO3: Perform different tests on road materials.

CO4: Select the suitable material for road construction.

1. Aggregate Testing (24 Hrs / 12 Classes)

Class (2 Hrs)	Topic	Sub-topics	Teaching Aids / Activities	Course Outcomes
1	Flakiness & Elongation (Part 1)	Exp 1: Introduction, setup, and sieving for Flakiness and Elongation Index.	Lab / Field Practice	CO3, CO4
2	Flakiness & Elongation (Part 2)	Exp 1: Weighing, calculations, and reporting Index of aggregates.	Lab / Field Practice	CO3, CO4
3	Crushing Strength (Part 1)	Exp 2: Preparation of aggregate specimen and setup in compression machine.	Lab / Field Practice	CO3, CO4
4	Crushing Strength (Part 2)	Exp 2: Determination of Crushing strength of Aggregates & calculations.	Lab / Field Practice	CO3, CO4
5	Impact Test (Part 1)	Exp 3: Aggregate Impact Value (AIV) testing machine setup and procedure.	Lab / Field Practice	CO3, CO4
6	Impact Test (Part 2)	Exp 3: Determination of Impact of Aggregates and reporting.	Lab / Field Practice	CO3, CO4
7	Abrasion Test (Part 1)	Exp 4: Los Angeles abrasion machine setup and charge preparation.	Lab / Field Practice	CO3, CO4
8	Abrasion Test (Part 2)	Exp 4: Determination of Abrasion value of Aggregates.	Lab / Field Practice	CO3, CO4
9	Angularity Number (Part 1)	Exp 5: Theory, setup, and cylinder calibration for angularity.	Lab / Field Practice	CO3, CO4
10	Angularity Number (Part 2)	Exp 5: Testing and calculation of Angularity Number of aggregates.	Lab / Field Practice	CO3, CO4
11	CBR Test (Part 1)	Exp 15: Preparation of soil/aggregate sample and mould setup for CBR test.	Lab / Field Practice	CO3, CO4
12	CBR Test (Part 2)	Exp 15: Loading, recording penetration dial gauge readings, and graph plotting.	Lab / Field Practice	CO3, CO4

2. Bitumen Testing (20 Hrs / 10 Classes)

Class (2 Hrs)	Topic	Sub-topics	Teaching Aids / Activities	Course Outcomes
13	Softening Point (Part 1)	Exp 6: Ring and Ball apparatus setup and sample preparation.	Lab / Field Practice	CO3, CO4
14	Softening Point (Part 2)	Exp 6: Heating, observation, and determination of softening point of bitumen.	Lab / Field Practice	CO3, CO4
15	Penetration Test (Part 1)	Exp 7: Preparation of bitumen sample and penetrometer calibration.	Lab / Field Practice	CO3, CO4
16	Penetration Test (Part 2)	Exp 7: Conducting penetration test of bitumen and determining grade.	Lab / Field Practice	CO3, CO4
17	Flash & Fire Point (Part 1)	Exp 8: Pensky-Marten closed cup apparatus setup.	Lab / Field Practice	CO3, CO4
18	Flash & Fire Point (Part 2)	Exp 8: Determination of Flash and Fire Point test of bitumen.	Lab / Field Practice	CO3, CO4
19	Ductility Test (Part 1)	Exp 9: Briquette mould preparation and water bath setup.	Lab / Field Practice	CO3, CO4
20	Ductility Test (Part 2)	Exp 9: Stretching the bitumen specimen and measuring ductility.	Lab / Field Practice	CO3, CO4
21	Viscosity Test (Part 1)	Exp 10: Introduction to orifice viscometer and temperature control.	Lab / Field Practice	CO3, CO4
22	Viscosity Test (Part 2)	Exp 10: Determination of Viscosity of bitumen in seconds.	Lab / Field Practice	CO3, CO4

3. Advanced Bitumen Tests & Field Visits (16 Hrs / 8 Classes)

Class (2 Hrs)	Topic	Sub-topics	Teaching Aids / Activities	Course Outcomes
23	Centrifuging Extractor (Part 1)	Exp 11: Setup of centrifuging extractor and sample weighing.	Lab / Field Practice	CO1, CO2, CO3

24	Centrifuging Extractor (Part 2)	Exp 11: Determination of bitumen content and solvent extraction.	Lab / Field Practice	CO1, CO2, CO3
25	Marshal Stability (Part 1)	Exp 12: Preparation of Marshal test specimen and compaction.	Lab / Field Practice	CO1, CO2, CO3
26	Marshal Stability (Part 2)	Exp 12: Determination of stability and flow of bitumen using apparatus.	Lab / Field Practice	CO1, CO2, CO3
27	Site Visit 1: Visual Inspection	Exp 13: Visit constructed road for visual inspection to identify defects.	Lab / Field Practice	CO1, CO2, CO3
28	Site Visit 1: Remedial Measures	Exp 13: Documenting defects and suggesting remedial measures.	Lab / Field Practice	CO1, CO2, CO3
29	Site Visit 2: Road Drainage	Exp 14: Visit road (flexible or rigid) to know the drainage condition.	Lab / Field Practice	CO1, CO2, CO3
30	Site Visit 2: Reporting	Exp 14: Preparing report on road types, geometry, and drainage.	Lab / Field Practice	CO1, CO2, CO3

Chinmay Mahavane
Signature of the Faculty D-24/7/26


Signature of the HOD 20/07/26