



CE 322 – Transportation Engineering Lab

Code and Name: CE 322 – Transportation Engineering Lab

Credit Hours: 1 (Lecture: 0, Tutorial: 0, Practical: 2)

Textbook:

- Traffic and Highway Engineering, N.J. Garber and L.A. Hoel, Cengage Learning, 5th Edition, 2015

Other References:

- Relevant international standards (ASTM, AASHTO)

- www.transportation.org and www.astm.org

- *Course handouts: distributed on a regular basis to provide more information on the topic.*

Course Description:

An experimental investigation for the properties of bitumen (penetration grade, softening point, flash and fire point, ductility, and viscosity), water content of emulsified asphalt, gradation of aggregates, maximum theoretical specific gravity of asphalt mixture, Marshall stability and flow. Analysis of experimental data and preparation of testing reports.

Pre-requisites: None

Co-requisites: CE 321 – Transportation Engineering

Course Learning Outcomes:

With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)

1. Recognize the issues related to various bitumen safety measures (4)
2. Design and conduct experiments in bituminous mixtures as per ASTM criteria. (6)
3. Identify, formulate, and interpret the laboratory results in mix design (1)
4. Demonstrate the ability to work in a team (5)
5. Communicate effectively in both oral and written (3)
6. Apply the techniques and skills in preparing the reports. (3)
7. Design and conduct experiment in penetration grade, temperature susceptibility and workability of bitumen (6)

Topics to be covered:

- Standard Test Method for Penetration of Bituminous Materials.
- Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus).
- Standard Test Method for Flash and Fire Points by Cleveland Open Cup.
- Standard Test Method for Ductility of Bituminous Materials.
- Standard Test Methods and Practices for Emulsified Asphalts.
- Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- Standard Test Method for Viscosity Determination of Asphalt Using Rotational Viscometer.
- Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures.
- Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

Grading Policy:

The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of 40% lab report, 10% midterm exam and 10% quiz, which is subject to modification by the lab instructor.

