Road Construction, Materials & Practices

Course Code	Credit Hours
CE- 448	3-0

Course Description

The course is designed for senior undergraduate students interested in the field of civil engineering materials and highway design. It emphasizes teamwork and involves collection of information from highway agencies and local industry regarding materials, design and specification requirements. The course objective is to develop technical competence in understanding fundamental behavior of materials used in pavements including soil-aggregate mixtures, asphalt binders and mixtures and Portland cement concrete, methods of field construction and quality control of these materials, role of material properties in design of pavements, testing methods, selection criteria, and standard specifications.

Text Book:

Reference Book:

1. Course Notes / Class Handouts by Instructor.
2. Hot Mix Asphalt Materials, Mixture Design and Construction, National Center for Asphalt Technology, Auburn University, 2nd Edition, 1996.
3. The Asphalt Handbook, Asphalt Institute, Manual Series No. 4, (MS-4), 1989.
4. Materials for Civil Highway Engineering, by K.N. Derucher, and G.P. Korfiatis, 2nd Edition, Prentice Hall, 1988.
5. Highway Materials, Soil and concretes, by Atkins, Reston Publishing Company, 1983.
6. Highway Engineering, by Oglesby.
7. Materials for Civil and Construction Engineers, by Michael S. Mamlouk and John P. Zaniewski, 1999.

Prerequisites :

CE 342-Transportation Engineering–II, CE-102 Civ Engg Material

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10

End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Introduction to CE 445, Objectives, Learning Outcomes and Assessment Methods. Intro to Pavement Materials
2	Road Construction – Introduction, Subgrade Function, Stabilization and Design. Base & Sub-base Function, Types and Design Factors.
3	Material and Characterization – Asphalt Refining, Uses, Types and Properties
4	Material and Characterization – Asphalt Cement Physical Tests and Grading Systems
5	Material and Characterization – Superpave Asphalt Binder Tests and Specifications
6	Road Construction – Types of asphalt Concrete Wearing Courses and their Functions.
7	Material and Characterization – Physical Properties of Aggregates
8	Material and Characterization – Objective and Elements of Mix Design. Material and Characterization – Marshall Mix Design Method
9	**MID SEMESTER EXAMS**
10	Material and Characterization – Asphalt Concrete Test and Properties
11	Material and Characterization – Properties of Hardened Concrete, Tests and Special Mixes.
12	Material and Characterization – PCA Mix Design
13	Construction Practices – Asphalt Concrete Batching and Mixing, Transport and Construction
14	Construction Practices – Special Mixes and additives in HMA
15	Construction Practices – Portland Cement Concrete, Mixing, Handling, Curing.
16	Term Project Presentations **Course Review**
17-18	End Semester Exam

Practical: Nil.