COURSE CODE: CVE 409  
COURSE TITLE: Highway Engineering  
NUMBER OF UNITS: 3 Units  
COURSE DURATION: Three hours per week

COURSE DETAILS:
Course Coordinator: Dr. O. S. ABIOLA  
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COURSE CONTENT:
Soil engineering aspects of Highways, Railways and Airfields. Highway geometrics; Route location; Pavement materials and laboratory tests; Fundamentals of traffic engineering- traffic studies and analysis- O-D survey, traffic counts

READING LIST:

LECTURE NOTES
HIGHWAY GEOMETRIC DESIGN

Factors Influencing Highway Design

Highway design is based on several design standards & controls, which depend on;

- Functional classification
- Expected traffic volume and vehicle mix
- Design speed

Design of the Alignment

- Horizontal alignment
- Vertical alignment
- Super-elevation
ROUTE LOCATION

- Techniques for Highway surveys
  - Ground surveys
  - Remote sensing

- Principles of Highway location
  - Office study: engineering, topography, geology etc.
  - Reconnaissance: is to identify several feasible routes
  - Preliminary location survey are used to evaluate the economic & environmental feasibility of the alternatives routes
  - Final location survey

- Preparation of highway plans
SOIL ENGINEERING

- **Soil Characteristics:**
  - Origin & formation of soils
  - Surface texture

- **Basic Engineering properties of soil**
  - Atterberg limits
  - Permeability
  - Shear strength

- **Classification of soils for Highway use** - AASHTO; USCS

- **Soil Tests for pavement design** - Compaction, CBR
BITUMINOUS MATERIAL

ó **Description and Uses of bituminous binders**- Asphalt cements; SC; RC asphalts, Asphalt emulsion

ó **Properties of asphaltic materials**
  - Consistency
  - Durability
  - Rate of curing
  - Resistance to water action

ó **Tests for asphaltic materials**- Consistency test; penetration test

ó **Asphaltic concrete** is a uniformly mixed combination of bitumen, coarse, fine aggregates & fillers
TRAFFIC ENGINEERING

- **Spot speed studies**: are conducted to estimate the distribution of speeds of vehicle in a stream of traffic at a particular location on a highway.

- **Speed characteristics**

- **Locations of spot speed studies**

- **Methods for conducting spot speed studies**

- **Presentation and Analysis of Spot speed data**

- **Headway**: space mean & time mean

- **Traffic Volume**: Different types of traffic counts are carried out, depending on the anticipated use of the data to be collected e.g ADT, AADT

- **Origin-Destination Study**