ABET course syllabus (Transportation Engineering)

1. Course number and name
   0901582: Transportation Engineering

2. Credits and contact hours
   3 Credit Hours

3. Instructor’s or course coordinator’s name
   Instructor: Hana Naghawi, Associate Professor of Civil Engineering
   Course Coordinator: Hana Naghawi, Associate Professor of Civil Engineering

4. Text book, title, author, and year
   a. other supplemental materials

5. Specific course information
   a. brief description of the content of the course (catalog description)
      • Introduction of the fundamental concepts of transportation engineering through an in-depth study of road-based transportation systems as well as of multi-modal transportation systems.
      • Air transportation: Airport planning, aircraft characteristics, airport configuration, landing area, airport capacity, and terminal area planning.
      • Rail transportation: Cross sections, horizontal and vertical alignments superelevation, trains speed, rail sections, joints and crossings.
      • Water transportation: Harbor types, harbor components, and harbor site selection. Urban transportation planning: Demand forecast, evaluation techniques, transportation system management, and mass transit.

   b. prerequisites
      Prerequisite: Pavement Design (0901482)

   c. indicate whether a required, elective, or selected elective course in the program
      Elective for Civil Engineering

6. Specific goals for the course
   a. By the end of this course, the student will be able to:
      • Explain the magnitude, variety, and complexity of transportation as a human activity and as an engineering discipline.
      • Identify and distinguish the key attributes of land, air, rail, and water modes.
• Identify and distinguish the planning, design, and operations phases of a transportation project.
• Identify and calculate the performance measures needed to carry out the appropriate analysis.

\(\text{b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.}\)

Course addresses ABET Student Outcome(s): c, and d

7. Brief list of topics to be covered

• Introduction
  o The Transportation System
  o Modes of Transportation
  o Transportation System Issues & Challenges

• The Nature of Transportation Engineering
  o Transportation Demand & Supply
  o Economic Theory in Transportation
  o Elasticity
  o Urban Transport
  o The Transportation Planning and Engineering Process

• Travel Forecasting
  o Inventory
  o Methods of Data Collection
  o Time and Cost Issues
  o Data Management
  o Zones and Networks

• Transportation Demand Estimation
  o Urban Travel Demand Estimation Process
  o Trip Generation
  o Trip Distribution
  o Mode Choice
  o Traffic Assignment
  o Traffic Impact Assessment (TEA)

• Air Transport
  o Airport as A System
  o Forecasting Air Transport Demand
  o Airport Master Planning
  o Airport Configuration
- Runway Decisions
- Taxiway Decisions
- Apron and Terminals

*Rail Transport*
- Definitions & Characteristics of Individual Rail Modes
- Geometric Elements & Design
- The Track System

*Water Transport*
- Port Classification, Details and Definitions
- Ships and their Characteristics