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*
   "Fundamentals of Transportation Engineering", by Jon D. Fricker and Robert K. Whitford, Prentice Hall, 2004, 5th printing

   a. *other supplemental materials*
      - "Papacostas, C.S. and prevedouros, Transportation Engineering and Planning, 3rd Edition, Prentice Hall, 2001.
      - Garber, N. and Hoel, L., Traffic and Highway Engineering, PWS Publishing, latest Edition.
      - Banks, J., Introduction to Transportation Engineering. 2nd Edition. MC-Graw Hill, 2002.

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.

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**
  - The Transportation System
  - Modes of Transportation
  - Transportation System Issues & Challenges

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

- **Travel Forecasting**
  - Inventory
  - Methods of Data Collection
  - Time and Cost Issues
  - Data Management
  - Zones and Networks

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

- **Air Transport**
  - Airport as A System
  - Forecasting Air Transport Demand
  - Airport Master Planning
  - 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