

Course Description: CVEEN 7545 Transportation Modeling

Offered Spring

Catalog Data

7545 Transportation Modeling (3) Prerequisite: CVEEN 5530 or 6530.

Transportation model study and development, definition, construction, calibration, validation, taxonomy of models, the modeling process.

Textbook

None

Coordinator: Peter T. Martin

Course Goals

- To learn and understand the principles of modeling
- To acquire a basic skill in model building, calibration and validation
- To acquire a basic skill in open ended problem solving

This is a practical course that will enable you to develop your own models using spreadsheet software. I'll be demonstrating various modeling techniques and will be using Microsoft Excel. If you really want to, you can use whichever application you prefer, but will find it easier to follow the Excel examples because you'll be able to pool resources and share ideas with your peers. The Instructor demonstrations will be all in Excel.

One of the other objectives of this course is to develop your problem solving skills. One of the best ways to acquire such skills is to tackle "Open Ended: Problems. Many Engineering problems are Open Ended. You'll find that the exercises sometimes have vague goals and objectives. This has been deliberately set up in this way because part of the challenge is for you to define the appropriate goals and objectives. In order to earn high credit for your models, you will have to demonstrate that you have understood and applied five problem-solving stages:

- Stage 1. Define the problem
- Stage 2. Generation of Alternative Solutions

- Stage 3. Analysis of Solutions
- Stage 4. Evaluation
- Stage 5. Selection

Prerequisites

CVEEN 3520 or instructor consent

Topics

The course is Lab oriented and Lab dominated. The lectures will serve to prepare and assist you with the Lab Exercises. Some of the topics we'll discuss in lectures are:

Model definition, appraisal, type, and function

The Classic Transportation Planning Model

Theoretical models and Empirical Models

Mathematical Techniques

- Probability

- Descriptive Statistics

- Regression Analysis

- Statistical Inference

- Random Data Generation

- Sampling theory

Computer Usage

The course is Lab oriented and Lab dominated. The lectures will serve to prepare and assist you with the Lab Exercises.

Laboratory Projects

There will be several specific model building laboratory exercises which will form the heart of the course. The models will look at the following Transportation problems:

- 1) Spread sheet introduction.
- 2) Further spread sheet functions.
- 3) Congestion pricing.
- 4) Gas price war.

- 5) Ferry model.
- 6) Pedestrian crossing.
- 7) Intersection/Traffic lights.(2 weeks)
- 8) Model review.

Course Content

Conceptualization and modeling of engineering problems are as much an art as a science. As an art, they attempt to develop simplified abstract representations of the real world, while capturing the essential aspects of the problem under investigation. Care must be taken to ensure that the concept is both relevant to the question of interest, and likely to yield valid results when quantified. As a science, models attempt to quantify conceptual relationships. Here the effort is devoted to gathering data, developing statistical relationships, and calibrating curves to ensure the results are accurate. Above all, models should be testable in the sense that the results can be verified and in the final analysis, shown to be feasible.