Queensland University of Technology
Transport Data Analysis and Modeling Methodologies

The objective of this course is to provide students with a general background in the application of various statistical and econometric analysis techniques and to provide new ideas for analyzing data in their research. The course will present a number of model-estimation methods that are used in transportation data analysis and other subject areas that deal with data analysis. While examples will be drawn primarily from transportation, the methods presented have broad applications to a variety of data-analysis applications. The material covered goes well beyond the techniques typically covered in statistics courses. While, the course will emphasize model estimation and application, the underlying theory and limitations will be discussed to ensure that the methods are properly applied and understood.

Time and location: 15 – 19 June, 2015; QUT Gardens Point Campus, 2 George Street, Brisbane

Website: https://engineering.purdue.edu/~flm/QUT-DTA.htm.

Supporting materials:

Text: Washington, S., M. Karlaftis, and F. Mannering (2011) Statistical and econometric methods for transportation data analysis, Second Edition, Chapman & Hall/CRC.

Notes: Transport Data Analysis and Modeling Methodologies, Lecture Slides.

Course contents

Day 1

Lecture Session 1   Course introduction

Lecture Session 2   Review of estimators and their properties; least squares regression; maximum likelihood estimation
(Text chapters 1-3)

Lab Session 1   **Ordinary Least Squares Estimation**

Lecture Session 3   Specification errors
(Text chapter 4)

(continued)

Day 1 (continued)

Lecture Session 4   Count-data models; Poisson regression; negative binomial; zero-inflated models count-data models
(Text chapter 11)

Lab Session 2   **Poisson Regression Estimation**

Lab Session 3   **Negative Binomial Regression**

Day 2

Lecture Session 5   Discrete outcome models and analysis of discrete data; economic theory and discrete choice models
(Text chapter 13)

Lab Session 4   **Multinomial Logit Estimation**

Lecture Session 6   Properties and estimation of multinomial logit models
(Text chapter 13)

Lab Session 5   **Model Evaluation: Likelihood Ratio Tests**

Lecture Session 7   Nested logit/generalized extreme value models – other logit properties
(Text chapter 13)

Lab Session 6   **Nested Logit Model Estimation**

Day 3

Lecture Session 8   Simultaneous equation models
(Text chapter 5)

Lab Session 7   **Seemingly Unrelated Regression Estimation/Three-Stage Least Squares**

Lecture Session 9   Duration models; censored data; parametric and nonparametric estimation
(Text chapter 10)

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Day 3 (continued)

Lab Session 8   **Duration Model Estimation**

Lecture Session 10   Ordered probability models, random effects
(Text chapter 14)

Lab Session 9   **Ordered Probit Estimation**

Day 4

Lecture Session 11   Introduction to random parameter models
(Text chapter 16)

Lab Session 10   **Mixed Logit Model Estimation I**

Lab Session 11   **Mixed Logit Model Estimation II**

Lecture Session 12   Random parameters count models
(Text chapter 16)

Lab Session 12   **Random Parameters Negative Binomial**

Lecture Session 13   Random parameters duration models
(Text chapter 16)

Lab Session 13   **Random Parameters Duration Model Estimation**

Day 5

Lecture Session 14   The latent-class logit model

Lab Session 14   **Latent-Class Logit Estimation**

Lecture Session 15   Bivariate/multivariate models (ordered probit)

Lab Session 15/15a   **Bivariate Ordered Probit/ Multivariate Binary Probit**

Lecture Session 16   Emerging Methods, Discussion, Course summary