University of Stellenbosch

Postgraduate course: Transportation Planning

13 – 16 March 2018

1. GENERAL OVERVIEW AND OBJECTIVES

The course focuses on the analysis and forecasting of the demand for transport services. A range of concepts and techniques are used in practice to quantify and model transport demand. This occurs at various levels, from the local level (relating to traffic impacts of individual sites or projects), to the level of metropolitan transport demand modeling, typically undertaken as a part of strategic long-term transport-land use planning, or the evaluation of large-scale urban projects. The aim of the course is to explore the characteristics of transport demand at these various levels, and to develop a working knowledge of the main concepts and quantitative techniques used in this field. We do this in the context of the realities and limitations of the South African context, and consider how modeling practice needs to evolve in response to contemporary issues.

The aims of the course are to provide students with:

- A basic understanding of the **principles, theory, and application** of transport demand data collection, analysis and modelling;
- **Practical experience** in applying conventional modelling approaches to solving a simple transport problem; and
- An introduction to the **limitations** of traditional modelling approaches, implications for modelling in developing countries, and emerging alternative approaches.

The approach of the course is to use a mix of lectures, problem-solving sessions, and demonstrations to impart a practical understanding of the material. Students will be encouraged to critically assess the applicability of the material covered in the South African planning context. Students will also get an opportunity to apply their knowledge to a multi-step practical modeling problem that will form the assignment for the course. This is done on a spreadsheet package, as we do not require students to learn to use formal transport modeling software for the purpose of the course.

Knowledge assumed to be in place includes:

- Basic knowledge of statistics and probability at a post-graduate engineering level;
- Familiarity with a spreadsheet software package like Excel.

2. LECTURER

Name	Telephone No. and Email Address
Assoc. Professor Christo Venter	Department of Civil Engineering University of Pretoria, Hatfield, Pretoria Tel. (012) 420-2184 *christo.venter@up.ac.za*

Guest lecturers are also used to present practical case studies.

Lecture dates:

Tuesday 13 to Friday 16 March 2018.

Examination:

There are no tests for this course.

The final examination is a closed book exam of not more than 3 hours. The date and venue will be advised by the Department.

3. STUDY MATERIALS

The prescribed material for the course consists of a text book:

> ***Modelling Transport**, J. de D. Ortúzar and L.G. Willumsen, 4th edition (2011), published by John Wiley and Sons.*

Selected pages from this text will be made available to students as part of the course notes. Note that the 3rd edition of the text (2001) may also be used as a reference, but students using this edition have to take responsibility for checking compatibility of the versions.

Additional material as indicated in this guide will also be provided.

4. ASSIGNMENTS

Students are required to complete one assignment for assessment.

The assignment allows students to explore and apply the concepts covered in class and in the readings. The assignment is in the form of a practical modelling exercise that explores the application of the classical transport modelling approach to a real-world situation. It also provides an opportunity for first-hand assessment of the strengths and weaknesses of the approach.

The assignment instructions will be handed out during the block week. It will contribute 40% to the final mark. Students must obtain a subminimum of 40% for both the exam and the assignment to pass the course.

Each student must do and hand in their own assignment.

Assignments must be submitted in hard copy at the time of the exam. No late assignments will be accepted.

5. LECTURE CONTENT AND PROGRAMME

1. Introduction
    i. Models and their role in urban transport planning
    ii. Evolution of urban travel demand models
    iii. The structure of the conventional transport modeling approach
2. Data and space
    i. Sampling
    ii. Data collection methods
    iii. Emerging methods and new technologies: GPS, web-based surveys, panels and continuous data strategies
    iv. Zones and networks
3. Trip generation
    i. Basic concepts
    ii. Growth factor methods
    iii. Regression analysis
    iv. Cross-classification approaches
4. Trip distribution
    i. Basic concepts
    ii. Growth factor models
    iii. Synthetic (gravity) models
5. Modal split
    i. Introduction
    ii. Diversion curves
6. Discrete choice models and stated preference analysis
    i. Theory of travel choices
    ii. Model specification and estimation of discrete outcome models
    iii. Stated preference analysis
7. Traffic assignment
    i. Basic concepts
    ii. All-or-nothing and stochastic methods
    iii. User equilibrium
8. Practical modeling issues and applications
    i. Software packages
    ii. Case study: transport modeling in South Africa
9. Critique of the conventional approach and new approaches
    i. Critique of the four-step model
    ii. Activity-based approaches
    iii. Agent-based simulation models

DAY	MORNING SESSION (8:30 TO 13:00)	REQUIRED READING	PRACTICAL (14:00 TO 16:00)
Tuesday	Course introduction Transport data collection Trip generation	*O+W 1.4 - 1.7* *O+W 3.1.1 - 3.1.1.2* *O+W 3.2.1* *O+W 3.3.1 –3.3.2* *O+W 3.5* *O+W 4.1 – 4.3.1*	*Linear regression exercise*
Wednesday	Trip distribution Modal choice	*O+W 5.1 – 5.3* *O+W 5.5* *O+W 5.8.1 – 5.8.6* *O+W 6.1 – 6.4*	*Introduction to course assignment*
Thursday	Discrete choice models Stated Preference analysis Transport networks	*WK&M 11.1 – 11.5.6* *O+W 3.4.1 – 3.4.2.2* *O+W 3.4.2.7*	*Logit practical*
Friday	Traffic assignment Case study Critique and new approaches	*O+W 10.1 – 10.3* *O+W 10.5.1, 10.5.3* *O+W 10.6, 10.7, 10.8* *O+W 11.1 - 11.2.2* *Class hand-outs*	*NO CLASS*

O+W = **Modelling Transport**, J. de D. Ortúzar and L.G. Willumsen, 3rd edition (2001).
WK&M = S**tatistical and Econometric Methods for Transportation Data** Analysis, S.P. Washington, M.G. Karlaftis & F.L. Mannering, Chapman & Hall/CRC (2003).

6. ADDITIONAL READING LIST

In addition to the sections of the texts indicated in the above table, the following two articles form part of the prescribed reading:

L. Kane and R. Behrens (2002), **Transport planning models: An historical and critical review**. Paper presented at 21st Annual South African Transport Conference, Pretoria, South Africa.

J. Castiglione, M. Bradley, & J. Gliebe, J. (2015). **Activity-Based Travel Demand Models: A Primer** SHRP 2 Report S2-C46-RR-1, Transportation Research Board, Washington, D.C. (Focus on *"Moving to Activity-based Travel Demand Models"* pp. 5-16).

Optional reading (not for examination):

B Flyvbjerg, M.K. Skamris Holm, and S.L. Buhl (2006), "Inaccuracy in Traffic Forecasts". **Transport Reviews**, Vol. 26, No. 1, pp. 1-24, January 2006.

A.J. Joubert, LAK Bloy, TG Pretorius, SL Burnett, TM Ueckermann and C Heimann (2001), **Predicting the future: How good were we?** Paper presented at 20th Annual South African Transport Conference, Pretoria, South Africa.

R. Pendyala, You, D., Garikapati, V., Konduri, K., & Zhou, X. (2017). "**Paradigms for integrated modeling of activity-travel demand and network dynamics in an era of dynamic mobility management**". Paper presented at The 96th Annual Meeting of the Transportation Research Board, Washington, DC.

L. Shen & P.R. Stopher (2014), "Review of GPS Travel Survey and GPS Data-Processing Methods", **Transport Reviews**, 34:3, 316-334.

E. A. Vasconcellos (2001), "The technical issue: Traditional Transport Planning", in **Urban Transport, Environment and Equity: The case for developing countries**, Earthscan, pp. 96 to 110.

C.J. Venter (2016), "**Are we giving BRT passengers what they want? User preference and market segmentation in Johannesburg**". Proceedings: 35th Southern African Transport Conference, July 2016, Pretoria, South Africa.

UNIVERSITY OF STELLENBOSCH

REGISTRATION DETAILS

SHORT COURSE ON

Transportation Planning

13 – 16 March 2018 (4 days only)

Course fee: R 9000.00

Postgraduate students (fee will be corresponded to you)

First Name and Surname:

.....……

Occupation/Position: ……

Company: …….

Student number: ……

Contact details for invoicing:

Contact person: ……..Office no: ……..

Cell No:..……. Email……...

"Cancellations will be accepted in writing and without penalty, up to 5 working days prior to commencement of the course. Participants cancelling in writing less than 5 working days prior to commencement of the course will be liable for a 50% cancellation fee. Following registration without attendance and without written cancellation, delegates will be held responsible for the full course cost."

I HAVE READ AND AGREE TO THE CONDITIONS OF REGISTRATION AS STIPULATED ABOVE

SIGNED: _____ DATE: _____

Reply deadline: 2 March 2018