MONASH University
Engineering

Postgraduate Program in Transport and Traffic

CIV5301: Traffic Engineering Fundamentals

Background and Aims

This unit is designed to lay important foundations of traffic engineering knowledge. It is designed to develop students' understanding of traffic flow theory as well as the analysis of signalised and unsignalised intersections. The unit is designed to provide a rigorous and practical coverage of the collection of traffic data. The traffic surveys component covers traditional techniques for counting, classification and origin-destination surveys as well as the capabilities of new traffic data collection equipment.

After completing this unit participants will:

- familiar with the basic parameters and theories of traffic flow
- able to design, undertake and analyse traffic surveys
- able to apply basic traffic flow theory to the analysis of unsignalised intersection capacity
- able to design timing plans for isolated traffic signals
- aware of the importance of traffic engineering and its relationship broader transport issues

Details of the structure of the unit are provided over the page

Enrolment Options

Enrol as a single unit or as part of either the Graduate Certificate in Transport and Traffic, Postgraduate Diploma in Transport and Traffic, or Masters in Transport and Traffic.

Off-Campus Study Mode

This unit is offered by Off-Campus (distance education) and there is no requirement for participants to attend lectures. Study guides, comprising a comprehensive set of course notes, are sent following enrolment. Further support is provided through a unit web site and via e-mail. The lecturer is available to answer questions and to provide assistance as necessary throughout the semester. Assistance can be arranged by email, facsimile, mail, telephone or through the discussion groups on the unit web site. Assessment comprises two assignments and an examination (worldwide exam venues are available).

Unit Co-ordinator

Geoff Rose is the Director of the Institute of Transport Studies and an Associate Professor of Civil Engineering at Monash University. Prior to joining Monash in 1994 he was a partner in a consulting practice, lectured at the University of Melbourne and worked in the Commonwealth Departments of Transport and Aviation. Geoff holds a Bachelor of Civil Engineering Degree from the Queensland Institute of Technology and a Master of Science and PhD from Northwestern University in the USA. His research interests cover Intelligent Transport Systems and Travel Behaviour.

Enrolment or General Course Enquiries:

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Structure

The unit is structured around 12 topics which are generally associated with one week of study

Topic	*After completing this topic, participants will:*
1. Introduction to Traffic Engineering	• understand the components of the 'Traffic System' • be able to define the role and activities of traffic engineers and appreciate the issues impacting on the profession
2. Traffic Surveys: A Systems Framework	• understand the steps involved in a systems approach to traffic surveys • appreciate the tradeoffs associated with the allocation of survey resources
3. Vehicle Volume and Classification Surveys	• appreciate the factors which influence the choice between manual and automatic data collection • design and run a manual counting survey and understand the features and capabilities of different automatic equipment • understand the basis on which vehicles are automatically classified
4. Speed, Travel Time and Origin-Destination Surveys	• appreciate the different methods used to collect travel time data • be able to distinguish direct from indirect methods for conducting origin-destination surveys • understand the steps involved in undertaking number plate surveys along the common sources of error and methods from controlling those errors
5. Traffic Generation and Parking Surveys	• appreciate the alternative techniques for collecting traffic generation data • understand the different survey techniques which can be employed in parking demand and supply surveys
6. Basic Traffic Variables and Relationships	• be able to define the basic variables used to describe traffic flow • describe and sketch the relationships between those variables • understand the basis on which road capacity is estimated
7. Uninterrupted Flow Analysis	• understand the types of events which produce shock waves in traffic • be able to analyse shock wave propagation in traffic to predict queue lengths and clearance times
8. Foundations of Unsignalised Intersection Analysis	• predict the length of queues and the delays caused by queues • define traffic headways and understand how they can be measured • understand the standard statistical distributions used to represent traffic headways
9. Analysis of Unsignalised Intersection Capacity	• understand how the critical gap is determined for a particular manoeuvre • be able to determine the capacities of particular approaches, delays likely to be experienced by road users and extent of queuing on the approaches to an intersection
10. Unsignalised Intersection Case Study	• be able to apply gap acceptance and queuing theory results to the practical design of unsignalised intersections • appreciate how traffic platoons can be accommodated in the analysis • appreciate how multiple levels of priority can be analysed
11. Principles of Traffic Signal Timing	• understand the saturation flow model for a signalised intersection • be able to analyse simple signalised intersections
12. Traffic Signal Timing Analysis	• be able to determine the cycle time and phasing for an intersection with unopposed turns • appreciate the complexity introduced by opposed turns and traffic signal linking