Background and Aims

This unit introduces students to the field of intelligent transport systems by examining component technologies and exploring how those component technologies are brought together in applications or products. Contemporary issues in the application of advanced technology in transport are considered including societal impacts and the roles of the public and private sectors.

After completing this unit participants will:

- understand the role that technology plays in addressing transport problems;
- understand the role of advanced technology, or intelligent transport systems (ITS), in improving the performance and reducing the impacts of urban transport (passenger and freight) modes;
- understand technology building blocks which underlie ITS;
- appreciate the functional areas of ITS and the characteristics of the technology in different application areas; and
- understand how ITS applications are built from component technologies and how those systems can be evaluated.

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

Enrolment Options

Enrol in either the Master of Transport or Master of Traffic or as a single unit. Exit options are also available for the Graduate Certificate in Transport and Traffic or the Graduate Diploma in Transport and Traffic.

Off-Campus Study Mode

The program is taught by off-campus learning which means you can balance your work and study while attaining your qualification with Monash University. There are no classes to attend so you can study where and when you like. Students from all over the world study in the postgraduate program, thanks to its flexible off-campus learning mode. Students and graduates can be found throughout Australia, New Zealand, the Middle East, Europe, North America and Africa.

A combination of printed study material and electronic communications are used in the delivery of the program. Academic assistance can be obtained by email or telephone. Discussion groups and other forms of on-line communication are also available for communicating with staff and other students.

Unit Co-ordinator

Nirajan Shiwakoti is a lecturer in the Institute of Transport Studies, Department of Civil Engineering, Monash University. He has a PhD in transportation engineering from Monash University. He graduated as a civil engineer and also has a master degree in urban and environmental engineering. Nirajan has a strong research interest in traffic and transportation engineering.

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**

<table>
<thead>
<tr>
<th>Topic</th>
<th>After completing this topic, participants will:</th>
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| 1. Introduction to Intelligent Transport Systems | • understand what is meant by the term ‘Intelligent Transport Systems’,  
• appreciate the goals of ITS,  
• be aware of the main functional areas within ITS,  
• appreciate the relationship of ITS to the solution of transport problems,  
• appreciate the user requirements for ITS, and  
• be aware of some current issues in the ITS field. |
| 2. Architecture and Standards | • the concept of an architecture,  
• the relevance of architecture in the context of ITS,  
• why architectures are desirable,  
• architecture terminology,  
• the current status of architectures around the world,  
• how an architecture is used,  
• how standards fit in with architectures and why standards are desirable,  
• the broad nature of the standards development process,  
• the likely contents of ITS standards, and  
• some of the arguments behind the debate about the most appropriate role of standards in ITS. |
| 3. Dynamic Data Collection Technology | • appreciate the range of sensors and detectors which can be deployed in ITS applications,  
• be aware of the factors which may influence the choice of one type of sensor or detector over another,  
• understand the operation of key sensors for collecting traffic flow data specifically inductive loops, wireless sensor networks and mobile phones, and  
• understand the alternative technologies available for locating vehicles. |
| 4. Communications Systems | • to understand the context of development of communications technologies,  
• to become familiar with terms relevant to communications,  
• to understand the role of communications in the ITS context and appreciate choices to be made in applying communications to ITS applications,  
• to broadly understand technologies and techniques applied to optimise wireline and wireless communications,  
• understand the alternative sign technologies, and  
• appreciate the human factors to be considered in the design of messages to be displayed on variable message signs (VMS). |
| 5. Computers Systems and Artificial Intelligence | • appreciate the relevance of hardware and software innovations in modern computing,  
• understand the common hardware components of a computer,  
• appreciate basic concepts in computer networking,  
• understand the relevance of artificial intelligence to modern computing, and  
• appreciate the fundamental concepts and applications of fuzzy logic, knowledge-based systems, neural networks, and genetic algorithms. |
| 6. Advanced Traveller Information Systems | • appreciate the range of options available for the management and control of motorway traffic,  
• understand the operation and performance issues associated with automated incident detection systems,  
• appreciate the role of variable speed limits on motorways, and  
• appreciate the role of ramp metering on motorways. |
| 7. Traffic Management and Control: Motorways | • appreciate the range of options available for the management and control of motorway traffic,  
• understand the operation and performance issues associated with automated incident detection systems,  
• appreciate the role of variable speed limits on motorways, and  
• appreciate the role of ramp metering on motorways. |
| 8. Traffic Management and Control: Arterials | • be aware of the history of the development of adaptive traffic signal systems and the potential impediments to wider deployment of these systems,  
• understand the essential elements of an adaptive traffic signal system, |
| 9. Vehicle-Based Systems | • appreciate some of the broad differences between the commercially available traffic signal systems,  
• understand how selective vehicle priority is implemented, and  
• appreciate how ITS technology is being used to assist non-motorised transport users. |
| 10. Electronic Payment | • list and describe the component technologies which make it possible to electronically collect tolls or road user fees,  
• compare and contrast the different electronic tolling technologies,  
• explain the general nature of the economic arguments behind electronic road pricing,  
• explain the similarities and differences between Electronic Toll Collection (ETC), Electronic Road Pricing (ERP) and value pricing,  
• outline social issues of relevant to value pricing initiatives, and  
• explain the nature and relevance of electronic payment to public transport operations. |
| 11. ITS Evaluation | • understand the distinction between appraisal, evaluation and assessment,  
• understand the general issues associated with appraisal and evaluation,  
• appreciate the different categories of assessment which are relevant in an ITS context,  
• understand the relevance of benefit-cost analysis (BCA), multicriteria analysis (MCA) and cost-effectiveness analysis (CEA) to ITS appraisal and evaluation, and  
• understand current Australian and overseas initiatives relating to evaluation of ITS investments. |
| 12. Implementation and Societal Issues | • appreciate the ways in which tort liability may shift from vehicle owners to manufacturers and operators of ITS applications,  
• appreciate how the shift in liability may complicate the implementation of ITS technology,  
• be familiar with possible methods to manage potential liability problems,  
• understand the principles associated with the fair handling of personal information,  
• appreciate the role of privacy codes of practice, and  
• be aware of broader equity issues associated with the implementation of ITS technology. |

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