COURSE DETAILS

Units of Credit 6
Contact hours  6 days (42 hours) short course

Lecture daily 09.00 am to 17.00 pm

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Room CE 508

Lecturer Peter Hidas (PH)
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Room CE 607

INFORMATION ABOUT THE COURSE

Ensuring the safe and efficient movement of passengers and goods on our streets and highways is a critical component of urban economic development and quality of life. Meeting this challenge is the central mandate for traffic engineering professionals. In this unit, students will gain a strong understanding of the major roles, responsibilities and technical expectations of such professionals, which are required by both public and private sector employees in this field. This study lays down the foundations on which you can build your knowledge in the field of traffic and transport engineering. First it presents basic concepts, methods and techniques used in many areas of design, analysis and management of road transport facilities. It then concentrates on the practical application of these concepts and methods in the short-term management and control of transport systems.

Link to virtual handbook:

OBJECTIVES

This course is designed to develop students’ understanding, skills and knowledge in the field of traffic and transport engineering. While the focus of the course is clearly on the design, analysis and management of urban road transport facilities, some aspects of rural traffic management are also included in the curriculum.

TEACHING STRATEGIES

The following teaching strategies will be used the course.

Private Study
• Review lecture material and textbooks
• Do set problems and assignments
• Use WebCT for discussions
• Download class notes from WebCT if not collected during classes
• Reflect on class problems and assignments
Lectures
• Find out what you must learn
• See methods that are not in the textbooks
• Follow worked examples
• Hear announcements on course changes

Tutorials
• Be guided by tutors
• Practice solving set problems
• Ask questions

Assessments
• Demonstrate your knowledge and skills
• Demonstrate higher understanding and problem solving abilities

EXPECTED LEARNING OUTCOMES

By successfully completing of the first strand of this course students will be able to

• Explain differences between the various fields of transport and traffic engineering;
• Recognise the importance of transport within the framework of Ecologically Sustainable Development;
• Explain relationships between fundamental traffic flow parameters;
• be familiar with the terminology used in traffic management,
• have a good understanding of the practical application of basic concepts, methods and techniques in urban traffic management studies,
• be able to design, undertake, analyse and interpret traffic surveys,
• be able to conduct simple traffic studies of urban and rural road sections, signalised and unsignalised intersections and local areas,
• to analyse and evaluate the current conditions,
• to recognise existing and potential problems,
• to identify possible aims and goals in line with current technical and environmental principles and
• to develop appropriate management and control strategies to achieve these goals.

For each hour of contact it is expected that a student will put in at least 1.5 hours of private study.

ASSESSMENT

The final grade for this course will be based on the sum of the scores from the assignments and the final examination. For the values of the single components see the table below:

Assignments (submitted during session) 40 %
Final examination 60 %

The final examination will be a three hour closed book written examination. Students will be
required to attempt three questions. The questions will generally be similar to the questions in assignments and the guided learning exercises. A pass must be achieved in each of these assessments.

Students who perform poorly in the assignment and tutorials are recommended to discuss progress with the lecturer during the semester. The lecturer reserves the right to adjust the final scores by scaling if agreed to by the Head of School.

ASSIGNMENTS

Assignment 1 – tutorial questions Due: Thursday, 7 April, 9 am
Assignment 2 – SIDRA project Due: Friday, 13 May, 9 am

Details of the assignments are given at the end of this document.

COURSE PROGRAM

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<th>Day</th>
<th>Date</th>
<th>Topic</th>
<th>Events and submissions</th>
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<tr>
<td>1</td>
<td>2 March</td>
<td>Introduction, Human Factors</td>
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<td>Traffic Flow Models</td>
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<td>3 March</td>
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<td>Capacity and Level of Service</td>
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<td>4 March</td>
<td>Unsignalised Intersections</td>
<td>SIDRA workshop</td>
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<td>Signalised Intersections</td>
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<td>4</td>
<td>7 April</td>
<td>Signalised Intersections</td>
<td>Assignment 1 due 9am</td>
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<td>Economic Evaluation</td>
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<td>Traffic Management</td>
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<td>Traffic Calming</td>
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<td>6</td>
<td>13 May</td>
<td>Traffic Impact Studies</td>
<td>Assignment 2 due 9am</td>
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<td>Travel Demand Management</td>
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REQUIRED/RECOMMENDED READING

All compulsory material required for this unit are provided to students in the lecture notes handed out during the lectures. Recommended reading references are listed below.


Part 4. Road Crashes.


Most of these references are available in the UNSW Library.

WEBCT

Copies of class notes and tutorial exercises are available on WebCT.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:
https://my.unsw.edu.au/student/resources/KeyDates.html

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person’s work or ideas as if they were your own. When it is necessary or desirable to use other people’s material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:
http://www.lc.unsw.edu.au/onlib/plag.html

COMMON SCHOOL INFORMATION

The minimum attendance requirement is 80% of all classes, including lectures and tutorials. You may fail the course if more than 20% absences are recorded. Please see the section on Special Consideration.

For information about:
- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations,
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Common School Information on the School website available at:
Assignment details

Assignment 1

Due Date: Thursday, 7 April 2011, 9 am
Weighting: 15 %

This assignment includes 3 tutorial questions, each worth 5 marks. The questions are based on the topics presented in the first 3 days. The questions will be distributed on Day 1.
Assignment 2

Due Date: Friday, 13 May 2011, 9am
Weighting: 25%

INTERSECTION ANALYSIS WITH SIDRA

The aim of this assignment is to learn and practice the basics of intersection operational analysis and design using the SIDRA software developed by R. Akcelik at the ARRB Transport Research Ltd. This assignment is to be completed by groups of 2 students.

This assignment involves fieldwork in the proximity of road traffic. Please exercise caution and wear bright clothing when moving across and around the carriageway.

The assignment covers the following tasks.

Task 1: Site identification and group formation

Select your group members from the class. Then, in agreement with the group members, select a signalised intersection for your assignment. The intersection should satisfy the following criteria:

- it should be neither too simple, nor too complex and large – the aim is to work with an intersection which does present some problems to solve, but not too difficult to deal with in this introductory educational exercise;
- it should NOT be a T-junction – these intersections are generally too simple for this exercise;
- it should be easy to access by the group for the site surveys;
- one intersection can only be selected by one group. In order to achieve this, students are requested to select their study area in consultation with other members of the class and the selected locations will be checked and approved by the lecturer. Locations will be accepted in the order of submissions received, so early submission of selected intersection (see below) is encouraged.

First submission: a short email document to Peter Hidas including the name(s) of student(s) in the group, and the selected location (intersection). This is required to check the suitability of the selected location and to avoid duplicate selections. Include the layout of the selected intersection from Google Maps. Only one email per group should be sent.

Due date: Monday 4 April 2011.

Task 2: Site survey and data collection

Visit the site and collect the following relevant data:

1. geometric layout data: prepare a schematic diagram of the intersection, mark the number of lanes, measure the lane widths, median width, pedestrian crossing locations, estimate the approach grades, note any parking and bus stop locations (distance from the stop line), parking restrictions etc. Note that the measurements do not have to be very accurate, it is enough to estimate approximate distances based on your stride length and the grade by just
visual observation. Be very careful when moving across the carriageway.

2. traffic control data: This survey must be carried out twice: once during the morning peak period (say between 7 and 9 a.m.), and once during the afternoon peak period (between 4 and 6 p.m.). Observe the traffic signal settings over several cycles. Note the vehicular and pedestrian movements that receive green signal at the same time, and this way, identify the signal phases and the full signal cycle. Then use a watch with seconds hand to measure at one second accuracy the length of each green phase and yellow period. Note any prohibited movements, if any. Note that most intersections in Sydney operate under adaptive signal control, which means that the phase times may be different in each cycle. Measure at least 5 full cycles to get an idea about the variation of phase times.

3. traffic data: This survey must be carried out twice: once during the morning peak period (say between 7 and 9 a.m.), and once during the afternoon peak period (between 4 and 6 p.m.). Count the number of vehicles in 5-minute intervals, for each movement separately for at least 15-20 minutes. You need to count light and heavy vehicles (any vehicle longer than 6 m and/or having more than 2 axles) separately. Also record the approximate number of pedestrians crossing in each designated crossing point (in two directions together). This survey requires sharing the task among all group members. One person can record one intersection approach in heavy traffic, or even two if the traffic is less intensive. From the observed data select the maximum 3 consecutive 5-min periods (based on the total approach flows), and calculate the maximum hourly flow rates for each movement from the 15-minute movement volumes.

Task 3: Analysis of existing conditions

Input the collected information into SIDRA and analyse the current operating conditions of the intersection separately for the morning and afternoon peak using the measured phase and cycle settings). Assess the performance indicators calculated by SIDRA and comment on the current conditions in terms of level of service. Identify any particular problems that may occur.

Task 4: Improvement alternatives and recommendations

If there is a need to improve the conditions, develop appropriate and feasible improvement alternatives separately for the morning and afternoon peak and use SIDRA to evaluate your suggestions. Estimate what is the best performance that can be achieved at the intersection with the suggested improvements. Make recommendations on the preferred alternatives.

Hints and suggestions:

1. the main objective of the assignment is to practice how to improve the flow conditions by altering the phase settings. It is not enough to let SIDRA calculate the optimum cycle time. Try at least two alternative phase arrangements.
2. If there is a need to recommend changes in the geometry of the intersection (eg. additional lanes, turning bays, etc.) you have to be realistic and look at the feasibility of your suggestions. However, as stated in the previous point, the main aim is to explore how the phase settings can be used for optimisation, and alter the geometry only if necessary.
3. Sometimes a turning ban (usually right-turn ban) may seem like an appropriate option to improve conditions at a particular intersection. If you suggest such a ban, it is only acceptable if you can recommend (and document in the report) feasible alternative routes for the banned movements. In assessing the benefits and disbenefits of such a suggestion, you need to take into account the extra length and time of travel that these vehicles would have to do.

4. If the intersection that you have selected is 'too good' - ie. there is no need to suggest improvements, then increase the flow levels by a factor which gives at least a few over-saturated movements, then attempt to improve the conditions for that assumed future flow level.

Task 5: Project report

Prepare a report on the data collection, analysis, the relevant results, comments and conclusions. This is a group assignment, and only one report per group is to be submitted. Maximum length is 5000 words (10 pages), excluding the appendices.

Notes:
1. briefly describe the site surveys, data collection, analysis and assessment of existing conditions, identified problems, improvement alternatives and their analysis by SIDRA, conclusions and recommendations.
2. The intersection layout figure from SIDRA must always be shown for the existing conditions, and for any proposed changes in the layout (including lane movement allocations)
3. demand flows per turning movement must always be shown in tables and figures.
4. phase settings (both current and any proposed) must always be shown in diagrams.
5. do NOT include all SIDRA outputs in the report. Select only the most relevant results (tables and/or figures) for the body of the report. You may attach some more in Appendices if you feel it is necessary but be selective in what you include. But make sure that the main report is a complete, stand-alone document that can be read and understood without the need to turn to the Appendices.
6. You need to refer to any output tables/figures in the text to explain and interpret what they mean.

The report also has to include:
- the individual contribution of each group member (the contribution sheet, attached). This may be used to adjust marks up or down for individuals in a team if it is clear that the workload has not been equally distributed.
- the marking sheet for the project (see attached)

The report must be bound. A standard cover sheet must be used.

Submission date & time: Friday, 13 May, 9am.
**ASSIGNMENT 2: INTERSECTION ANALYSIS WITH SIDRA MARKING SHEET**

*Include with report as first page after the cover sheet!*

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| Data collection and presentation | - completeness  
- correctness  
- clarity |
| Analysis of Existing conditions  
Identification of problems |  |
| Development of alternatives: | - logic: are they based on identified problems?  
- feasibility  
- analysis and presentation |
| Recommendations and justification |  |
| Report presentation | - text: structure, readability, style  
- figures and tables: clarity, relevance, conciseness |
| Contribution sheet: |  |
| Other comments |  |
| **Mark (out of 25)** |  |
CONTRIBUTION SHEET
Include with report after the marking sheet!
ASSIGNMENT 2: Each team member’s contribution must be clearly indicated on this sheet to be handed in with your report and signed by all team members. This should include a written description of what each person did and their percentage contribution to the overall project. This may be used to adjust marks up or down for individuals in a team if it is clear that the workload has not been equally distributed.

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I agree with this contribution information:

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<th>TEAM MEMBER NAME</th>
<th>AGREE (Y/N), IF NO, PROVIDE EXPLANATION</th>
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