

CI9-T-08 Road Traffic Theory and its Application

Course leader:	Dr Bani Anvari (BA)
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Module status:	Elective
Pre- or co-requisites:	CI9-T-03, CI9-T-11
Term:	Spring
Contact hours:	30
ECTS units:	6 (MSc)
FHEQ Level:	7
Assessment:	Written examination

1.0 Aims

- To introduce vehicle-following and fluid models of traffic flow; applications of traffic models.
- To cover traffic queues: steady state and time-dependent analysis. Modelling, analysis and design of priority junctions and roundabouts.
- To understand signal control at individual junctions; coordinated signal control; priority for public transport in signal control; design of signal-controlled road junctions; principles of urban traffic control and calculation of timing plans.
- To cover comprehensive traffic management – objectives, techniques, modelling and evaluation.
- To consider the nature and process of formulating transport policy, with an emphasis on urban transport policy. Covers setting policy objectives, the main types of policy measures typically introduced in urban areas, and their impacts on behaviour.
- To cover interactions between transport policy and other policy areas.

2.0 Syllabus

- This course provides students with an introduction to the subject of traffic flow theory and its application to various aspects in traffic engineering and control.
- Topics cover various kinds of traffic models ranging from microscopic to macroscopic, performance analysis and control of transport systems, and state-of-the-art applications in practice.
- The students will also have a chance to apply the theories through a set of exercises.
- The students will also have a chance to apply the theories through a set of exercises with practical software packages including ARCADY, PICADY, and TRANSYT.

Location	No.	Topic	Staff
UCL	01-02	Car-following models and fluid models of traffic flow	BA
UCL	03-04	Applications of traffic models	BA
UCL	05-06	Time-dependent analysis of traffic queues	BA
UCL	07-08	Modelling and analysis of priority junctions and roundabouts	BA

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UCL	09-10	Signal controlled junctions	BA
UCL	11-12	Motorway analysis and management	BA
UCL	13-14	Bus priority and operations	BA
UCL	15-16	Urban traffic signal control	BA
UCL	17-18	SCOOT urban traffic control system	NH
UCL	19-20	Traffic data and performance measures	NH
UCL	Activity 1	Introduction to exercise on traffic flow	BA
UCL	Activity 2	Introduction to exercise based on ARCADY and PICADY	BGH
UCL	Activity 3	Exercise on urban signal design TRANSYT	BGH

3.0 Intended learning outcomes

On successfully completing this course unit, students will be able to:

- Show how current techniques for design of elements of the road system, and the management and control of all kinds of traffic on the roads, are supported by fundamental understanding, modelling and optimisation techniques.

4.0 Teaching methods

A combination of lectures and tutorials.

5.0 Assessment

Assignment Title	Date Set	Date Due	Return Date	Coursework Weighting	Set by
CW1: Exercise on traffic flow theory	Lecture session 3-4	Lecture session 7-8	Lecture session 11-12	33%	BA
CW2: Introduction to exercise based on ARCADY and PICADY	Lecture session 7-8	Lecture session 11-12	Lecture session 15-16	33%	BGH
CW3: Exercise on urban signal design TRANSYT	Lecture session 15-16	Lecture session 19-20	Two weeks after Lecture 19-20	33%	BGH

6.0 Subject threads

The table below shows how the themes of design, sustainability and health & safety risk management are embedded in the curriculum (as defined by the JBM degree guidelines).

Key: Primary (P), Secondary (S) and Contributory (C).

Design	Health & Safety Risk Management	Sustainability
P	C	C