



DEPARTMENT OF
CIVIL ENGINEERING
UNIVERSITY OF MORATUWA

M.Eng. in Highway &
Traffic Engineering

MSc. in Transportation

Programme Handbook

2022/2023



Transportation Engineering Division
Department of Civil Engineering
University of Moratuwa

<https://uom.lk/civil/divisions/transportation-engineering>

Important Note

Every effort has been made to ensure the accuracy of the information given in this booklet, but the University cannot accept responsibility for any errors or omissions. University courses are continually reviewed and revised and there may well be some changes between the date of publication and the date the student embarks on the course. The University reserves the right to amend By-laws and Regulations governing courses of study whenever it sees fit. Students and other interested parties should make enquires from the Course Co-ordinator about any changes to the programme and its modules/courses as close to the beginning of the academic year as possible. Admittance to the University is subject to the requirement that the student will comply with the University's registration and examination procedures and will duly observe the By-laws and Regulations of the University.

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1 Introduction

Welcome to the Department of Civil Engineering at the University of Moratuwa, Sri Lanka. We hope this handbook will give you the background information you need during your studies at the University. *Please read it carefully and keep it for future reference.*

You will find in this handbook an outline of the PG Course in Highway & Traffic Engineering and Transportation for the academic year 2022/2023. In addition to academic information, the handbook also provides details of the environment within which we operate; an outline of our procedures with regard to teaching and learning methods, attendance and assessment are also included. We place great importance on our relationship with our students and are anxious to listen and help. To foster this, we hope that in addition to formal arrangements there will be a great deal of informal contact. It tells what we expect of you and what you can expect from us.

The Department of Civil Engineering believes that one of its responsibilities is to provide students with a framework, which helps them to achieve their full potential and capabilities. We abide by the University's teaching aims, i.e.

- To provide quality teaching that is informed and invigorated by the research and scholarship of staff;
- To engender in students a commitment to continuing self-improvement and the development of their skills in order to facilitate their full contribution to the society in which they live;
- To sustain a culture of research and teaching that is able to foster both the free pursuit of truth and the impartial analysis of values as well as being responsible and responsive to present and anticipated social needs;
- To inculcate a sense of respect for the traditions of higher education and a commitment to the values of truth, tolerance and justice.

In pursuing these aims your learning programme in the Department of Civil Engineering will emphasise:

- Student-centred learning as the means of developing an appreciation of both the spirit and practice of enquiry;
- Conceptual thinking as the key to understanding complex phenomena;
- Awareness and understanding of empirical research;
- Systematic development and assessment of students' personnel and transferable skills;
- Skills development to create new knowledge through active learning and original research; and
- Systematic development of skills through new methods of teaching and learning to use new knowledge to prosper industry.

2 Information about the Department of Civil Engineering

At present the Department of Civil Engineering is one of the largest entities in the whole university system of Sri Lanka with 40 staff members in the faculty having postgraduate qualifications and a further 3 staff members currently undergoing postgraduate training abroad. It also has the services of 33 non-academic staff. In terms of student numbers the department has around 500 undergraduate students and about 200 postgraduate students consisting of about 150 part-time students by course, and 50 full time students by research.

The department has six specialist divisions functioning as study groups for academic and research purposes. These divisions are Structural, Hydraulics, Geotechnical, Environmental, Construction Engineering & Management and Transportation.

In addition to teaching and research, staffs undertake consultancy work on a variety of subjects. These vary from experimental testing, design assignments to appraisals. The staff is closely linked with the industry. Many staff members serve on Boards of Management in the industry and Executive Committees of professional bodies.

3 Information about the Transportation Engineering Division

The Transport Engineering Division is an integral part of the Department of Civil Engineering. It is comprised of four academic staff members who have obtained postgraduate qualifications in different areas of transportation engineering that include traffic engineering, highway engineering and transport planning. It is a leading academics group of Transport & Highway Engineering in Sri Lanka. The Division is responsible for conducting lectures, practicals and research for civil engineering undergraduate students. The Division also conducting two postgraduate courses; MEng /PG Diploma in Highway & Traffic Engineering and MSc/PG Diploma in Transportation. The academic staff undertakes the supervision of full-time PhD/MPhil/MSc research students and around 8-10 research students work on different areas of research at a given time.

An increased Transportation Engineering component was introduced to the BSc Civil Engineering curricular in 1992 and subsequently revised in 2000 and 2009. Under the new syllabus, specialized transport courses are taught at second year and fourth year levels. The second year subject covers an introduction to transport and traffic engineering theory. The compulsory fourth year subject covers basics in highway geometry, material and design. The optional fourth year subjects impart theoretical knowledge of traffic engineering, intersection controls, traffic management, pavement design, Geometric design and road safety, highway construction and maintenance, transport systems planning & operations with project base assignments. Field work including Traffic impact assessments, safety audits, capacity design, signal design and advanced computer packages such as Trans Plan, HDM4 and Auto Cad Auto Desk Civil 3D are introduced and practical have been designed to provide experience in conducting basic traffic and transport surveys and studies.

In addition to conducting the undergraduate and postgraduate course of studies, the Division of Transportation Engineering has been carrying out a fully fledged research and consultancy programs. Emphasis has been on applied research and the determination of applications for Sri Lanka. Research is also carried out at different levels of the

academic program in order to inculcate the principles and practice of research among the students. The TED also undertakes transport studies, traffic surveys, highway design, design of rigid and flexible pavements, feasibility studies and assessments and highway material testing. An emphasis is made on collaborative studies such that the capability of private and state sector organizations and its officers in carrying out such studies is also developed. The division is also conducting Continuous Professional Development Programs (CDP) in all areas of transport. Transportation Engineering Division holds two laboratories; highway engineering laboratory - a fully fledged testing laboratories with latest equipments and transportation engineering laboratory that is equipped with GIS and other software facilities and traffic survey equipments, and a resource center for transport related literature.

Web address: www.mrt.ac.lk/web/civil/divisions/transportation/pg-course

4 Information about the M.Eng/PG. Diploma in Highway & Traffic Engineering and M.Sc./ PG Diploma in Transportation

The participants for the postgraduate courses – PG Diploma/MEng in Highway & Traffic Engineering and PG Diploma/MSc in Transportation are selected after open advertisement, on the basis of their educational qualifications, experience and relevance of the studies to their work. Throughout the years, participants for Highway & Traffic Engineering and Transportation post graduate courses have come from a wide range of government's organisations as well as from the private sectors organisations. Most of the participants are sponsored by their respective organisations such as the Road Development Authority (RDA), Road Construction & Development Co. (Pvt.) Ltd (RC&DC), Colombo Municipal Council (CMC), Sri Lanka Railway (SLR), National Transport Commission, Department of National Planning, Ministry of Transport & Highways, Provincial Road Development Authority etc.

These two postgraduate programs are part time courses, running parallel, leading to either Master of Engineering or Master of Science degrees. The first year of the course is mainly lectures – oriented, with written examinations, assignments, seminars and field works. At the end of the 1st semester, the students can undertake a research project under supervision.

The syllabi for the PG courses are continuously upgraded to impart specialised knowledge and competence in state of the art techniques. The core subjects cover areas of transport policy and planning, transport economics and traffic engineering. General subjects include finance, costing, management and law taught at a level applicable to a practising transport professional. An emphasis is made on analytical methods, which is taught under two full subjects. The specialised subjects cover highway planning, design, construction & maintenance, advanced traffic engineering and geotechnical engineering for the highway course and urban transport planning, demand analysis, public transport operations and advanced transport economics for the transport students. The course is also designed to obtain 'hands-on' experience in fieldwork, analysis and planning stages of transport projects.

Due to the multidisciplinary nature of the programs, the teaching staff for the post graduate course are drawn from other divisions in the Department of Civil Engineering, such as Construction Management, Geotechnical, Soil & Mechanisms, the Department of Town & Country Planning at Moratuwa University, other universities, several outside agencies, such as the RDA, Central Bank etc. and from private sector organisations also.

5 Structure of M.Eng/PG. Diploma in Highway & Traffic Engineering and M.Sc./ PG Diploma in Transportation

5.1 Registration & Course Administration

An applicant selected for admission may register having paid the prescribed fees. The registration procedure shall be as determined by the senate. The effective date of registration will be the date of commencement of the course with greater weight age on instruction.

If in the opinion of the Department, the performance of a student is consistently unsatisfactory over a period of six months, his/her registration may be cancelled by the Senate on the recommendation of the Faculty.

The registration for the M.Eng./M.Sc. Degree may be reverted to the Post-graduate Diploma and the student considered for the award of the post-Graduate Diploma by the Senate on the recommendation of the Faculty, under the regulations governing the award of the Post - graduate Diploma, at the end of the course or any time thereafter, provided

- (a) the student opts to obtain the Post-graduate Diploma or
- (b) There are other valid reasons for such a change; or
- (c) The performance of a student for the M.Eng./M.Sc. Degree is not up to the requisite standard in the opinion of the Department.

5.2 Course Outline

The M.Eng./M.Sc. Degree courses are a Six Semester part-time degree programmes consisting of a common core, a compulsory Highway & Traffic Engineering core, a compulsory Transportation core, respective electives cores and a compulsory research project. These two Masters courses with greater weight age on instruction by lectures shall consist of the following;

- a) Attending regular lectures at the University as envisaged in the curriculum approved by the Faculty and the senate.
- b) Preparation and presentation of one or more seminars on topics approved by the Head of the department concerned
- c) Any other assignments such as laboratory work, tutorials, field trips.
- d) Project work in a specified area under the guidance of a supervisor or supervisors, the results of which shall be presented in the form of a Dissertation. The format of the Dissertation and the number of copies to be submitted shall be decided by the Faculty. The supervisor(s) shall be assigned to a student by the Head of the Department concerned. Normally duration of one-third of the total duration shall be assigned to project work.

5.2.1 Common Core Modules for both streams

Subject Code	Subject
CE 5601	Quantitative Methods for Transport Analysis
CE 5602	Systems and Operational Research Methods in Transport
CE 5603	Road Safety, Social & Environmental Evaluations
CE 5604	Project Management
CE 5619	Research Methods
CE 6620	MSc/MEng Dissertation

5.2.2 Additional Core Modules for Highway & Traffic Engineering

Subject Code	Subject
CE 6601	Highway Construction & Maintenance Techniques
CE 6602	Traffic Engineering
CE 6603	Highway Infrastructure Design
CE 6604	Geotechniques and Pavement Analysis

5.2.3 Elective Modules for Highway & Traffic Engineering

Subject Code	Subject
CE 5605	Traffic Management & Intelligent Transport Systems
CE 5606	Highway Planning & Management
CE 5607	Transport Project Planning and Appraisal
CE 6611	Urban & Regional Transport Planning
CE 6631	GIS and Geomatics in Transport Planning
CE 6632	Railway & Airport Infrastructure
CE 6633	Freight Transport & Logistics
CE 6634	Advanced Methods in Road and airfield Infrastructure Design
CE 6635	Sustainable Transport Systems

5.2.4 Additional Core Modules for Transportation

Subject Code	Subject
CE 6611	Urban & Regional Transport Planning
CE 6612	Transport Demand Analysis
CE 6613	Public Transport Systems
CE 6614	Transport Economics

5.2.5 Elective Modules for Transportation

Subject Code	Subject
CE 5605	Traffic Management & Intelligent Transport Systems
CE 5606	Highway Planning & Management
CE 5607	Transport Project Planning and Appraisal

Subject Code	Subject
CE 6631	GIS and Geomatics in Transport Planning
CE 6632	Railway & Airport Infrastructure
CE 6633	Freight Transport & Logistics
CE 6635	Sustainable Transport Systems

5.3 Tentative program

Year 1				
	Time	Semester 1	Semester 2	Semester 3
Friday	4.30pm-7.30pm		SMT	PM
Saturday	9.00am -12.00pm	RM	HCM	TE/ TDA
	12.00pm-1.00pm		lunch break	lunch break
	1.00pm-4.00pm	RM	TPP	RSE
	4.00pm-4.30pm		Break	break
	4.30pm-7.30pm	RM	TMS	UTP
Year 2				
	Time	Semester 4	Semester 5	Semester 6
Friday	4.30pm-7.30pm	QMT	GPA/ECO	
Saturday	9.00am -12.00pm	HID/PTS	FTL	RP-I
	12.00pm-1.00pm	lunch break	lunch break	
	1.00pm-4.00pm	RAI	HPM	
	4.00pm-4.30pm	Break	break	
	4.30pm-7.30pm	GIS	RAD	

QMT	Quantitative Methods for Transport Analysis
SMT	Systems and Operational Research Methods in Transport
RSE	Road Safety, Social & Environmental Evaluations
PM	Project Management
TMS	Traffic Management & Intelligent Transport Systems
HPM	Highway Planning & Management
TPP	Transport Project Planning and Appraisal
RM	Research Methods
HCM	Highway Construction & Maintenance Techniques
TE	Traffic Engineering
HID	Highway Infrastructure Design

GPA	Geotechniques and Pavement Analysis
UTP	Urban & Regional Transport Planning
TDA	Transport Demand Analysis
PTS	Public Transport Systems
ECO	Transport Economics
GIS	GIS and Geomatics in Transport Planning
RAI	Railway & Airport Infrastructure
FTL	Freight Transport & Logistics
RAD	Advanced Methods in Road and airfield Infrastructure Design

6 Assessment Summary

6.1 Post Graduate Diploma in Transportation [at least 40 credits from the following list]

Core Modules (28 credits)

Code	Subject	Credits*	Evaluation (%)	
			Continuous Assessment	Final Exam
CE 6611	Urban & Regional Transport Planning	3	30 ± 10	70 ± 10
CE 6612	Transport Demand Analysis	3	30 ± 10	70 ± 10
CE 6613	Public Transport Systems	3	30 ± 10	70 ± 10
CE 6614	Transport Economics	3	30 ± 10	70 ± 10
CE 5601	Quantitative Methods for Transport Analysis	3	50 ± 10	50 ± 10
CE 5602	Systems and Operational Research Methods in Transport	3	50 ± 10	50 ± 10
CE 5603	Road Safety, Social & Environmental Evaluations	3	40 ± 10	60 ± 10
CE 5604	Project Management	3	40 ± 10	60 ± 10
CE 5619	Research Methods	1	100	
CE 5620	Research Project I	3	100	

Elective Modules (at least 06 credits)

CE 5605	Traffic Management & Intelligent Transport Systems	3	30 ± 10	70 ± 10
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CE 5607	Transport Project Planning and Appraisal	3	30 ± 10	70 ± 10
CE 6633	Freight Transport & Logistics	3	30 ± 10	70 ± 10
CE 6635	Sustainable Transport Systems	3	30 ± 10	70 ± 10

Optional Modules

CE 5606	Highway Planning & Management**	3	30 ± 10	70 ± 10
CE 6631	GIS and Geomatics in Transport Planning	3	30 ± 10	70 ± 10
CE 6632	Railway & Airport Infrastructure	3	30 ± 10	70 ± 10

6.2 M. Sc. Degree in Transportation [at least 60 credits from the following list]

Core Modules (45 credits)

Code	Subject	Credits*	Evaluation (%)	
			Continuous Assessment	Final Exam
CE 6611	Urban & Regional Transport Planning	3	30 ± 10	70 ± 10
CE 6612	Transport Demand Analysis	3	30 ± 10	70 ± 10
CE 6613	Public Transport Systems	3	30 ± 10	70 ± 10
CE 6614	Transport Economics	3	30 ± 10	70 ± 10
CE 5601	Quantitative Methods for Transport Analysis	3	50 ± 10	50 ± 10
CE 5602	Systems and Operational Research Methods in Transport	3	50 ± 10	50 ± 10
CE 5603	Road Safety, Social & Environmental Evaluations	3	40 ± 10	60 ± 10
CE 5604	Project Management	3	40 ± 10	60 ± 10
CE 5619	Research Methods	1	100	
CE 6620	MSc/MEng Dissertation	20	100	-

Elective Modules (at least 15 credits)

CE 5605	Traffic Management & Intelligent Transport Systems	3	30 ± 10	70 ± 10
CE 5606	Highway Planning & Management**	3	30 ± 10	70 ± 10

CE 5607	Transport Project Planning and Appraisal	3	30 ± 10	70 ± 10
CE 6631	GIS and Geomatics in Transport Planning	3	30 ± 10	70 ± 10
CE 6632	Railway & Airport Infrastructure	3	30 ± 10	70 ± 10
CE 6633	Freight Transport & Logistics	3	30 ± 10	70 ± 10
CE 6635	Sustainable Transport Systems	3	30 ± 10	70 ± 10

Elective modules will be offered subject to availability of resources.

** Only for candidates with Engineering or Science Degree

6.3 Post Graduate Diploma in Highway & Traffic Engineering [at least 40 credits from the following list]

Compulsory Modules (28 credits)

Code	Subject	Credits*	Evaluation (%)	
			Continuous Assessment	Final Exam
CE 6601	Highway Construction & Maintenance Techniques	3	30 ± 10	70 ± 10
CE 6602	Traffic Engineering	3	30 ± 10	70 ± 10
CE 6603	Highway Infrastructure Design	3	30 ± 10	70 ± 10
CE 6604	Geotechniques and Pavement Analysis	3	30 ± 10	70 ± 10
CE 5601	Quantitative Methods for Transport Analysis	3	50 ± 10	50 ± 10
CE 5602	Systems and Operational Research Methods in Transport	3	50 ± 10	50 ± 10
CE 5603	Road Safety, Social & Environmental Evaluations	3	40 ± 10	60 ± 10
CE 5604	Project Management	3	40 ± 10	60 ± 10
CE 5619	Research Methods	1	100	
CE 5620	Research Project I	3	100	

Elective Modules (at least 09 credits)

CE 5605	Traffic Management & Intelligent Transport Systems	3	30 ± 10	70 ± 10
CE 5606	Highway Planning & Management	3	30 ± 10	70 ± 10

CE 5607	Transport Project Planning and Appraisal	3	30 ± 10	70 ± 10
CE 6611	Urban & Regional Transport Planning	3	30 ± 10	70 ± 10
CE 6631	GIS and Geomatics in Transport Planning	3	30 ± 10	70 ± 10
CE 6632	Railway & Airport Infrastructure	3	30 ± 10	70 ± 10

Optional Modules

CE 6633	Freight Transport & Logistics	3	30 ± 10	70 ± 10
CE 6634	Advanced Methods in Road and airfield Infrastructure Design	3	30 ± 10	70 ± 10
CE 6635	Sustainable Transport Systems	3	30 ± 10	70 ± 10

6.4 M. Eng. Degree in Highway & Traffic Engineering [at least 60 credits from the following list]

Core Modules (45 credits)

Code	Subject	Credits*	Evaluation (%)	
			Continuous Assessment	Final Exam
CE 6601	Highway Construction & Maintenance Techniques	3	30 ± 10	70 ± 10
CE 6602	Traffic Engineering	3	30 ± 10	70 ± 10
CE 6603	Highway Infrastructure Design	3	30 ± 10	70 ± 10
CE 6604	Geotechniques and Pavement Analysis	3	30 ± 10	70 ± 10
CE 5601	Quantitative Methods for Transport Analysis	3	50 ± 10	50 ± 10
CE 5602	Systems and Operational Research Methods in Transport	3	50 ± 10	50 ± 10
CE 5603	Road Safety, Social & Environmental Evaluations	3	40 ± 10	60 ± 10
CE 5604	Project Management	3	40 ± 10	60 ± 10
CE 5619	Research Methods	1	100	
CE 6620	MSc/MEng Dissertation	20	100	

Elective Modules (at least 15 credits)

CE 5605	Traffic Management & Intelligent Transport Systems	3	30 ± 10	70 ± 10
CE 5606	Highway Planning & Management	3	30 ± 10	70 ± 10
CE 5607	Transport Project Planning and Appraisal	3	30 ± 10	70 ± 10
CE 6611	Urban & Regional Transport Planning	3	30 ± 10	70 ± 10
CE 6631	GIS and Geomatics in Transport Planning	3	30 ± 10	70 ± 10
CE 6632	Railway & Airport Infrastructure	3	30 ± 10	70 ± 10
CE 6633	Freight Transport & Logistics	3	30 ± 10	70 ± 10
CE 6634	Advanced Methods in Road and airfield Infrastructure Design	3	30 ± 10	70 ± 10
CE 6635	Sustainable Transport Systems	3	30 ± 10	70 ± 10

7 The Teaching Faculty and Module Lecturers

7.1 Module Co-ordinators

Code	Subject	Module Coordinator
CE 5601	Quantitative Methods for Transport Analysis	Prof. J.M.S.J. Bandara
CE5602	Systems and Operational Research Methods in Transport	Prof. J.M.S.J. Bandara
CE 5603	Road Safety, Social & Environmental Evaluations	Dr.H.R.Pasindu
CE 5604	Project Management	Dr.H.L.K.Perera
CE 5605	Traffic Management & Intelligent Transport Systems	Prof. J.M.S.J. Bandara
CE 5606	Highway Planning & Management	Dr. H.R.Pasindu
CE 5607	Transport Project Planning and Appraisal	Dr. H.R.Pasindu
CE 5619	Research Methods	Prof. J.M.S.J.Bandara
CE 6601	Highway Construction & Maintenance Techniques	Prof. W.K. Mampeararchi
CE 6602	Traffic Engineering	Prof. J.M.S.J. Bandara
CE 6603	Highway Infrastructure Design	Prof. W.K. Mampeararchi
CE 6604	Geotechniques and Pavement Analysis	Prof. W.K. Mampeararchi
CE 6611	Urban & Regional Transport Planning	Dr. G.L.D.I.De Silva
CE 6612	Transport Demand Analysis	Dr. G.L.D.I.De Silva
CE 6613	Public Transport Systems	Dr. G.L.D.I.De Silva
CE 6614	Transport Economics	Dr.H.R.Pasindu
CE 6631	GIS and Geomatics in Transport Planning	Dr.H.L.K.Perera
CE 6632	Railway & Airport Infrastructure	Dr.H.R.Pasindu
CE 6633	Freight Transport & Logistics	Prof. J.M.S.J. Bandara
CE 6634	Advanced Methods in Road and airfield Infrastructure Design	Dr.H.R.Pasindu
CE 6635	Sustainable Transport Systems	-

7.2 Module Lecturers

Subject Code	Subject	Lecturer
CE 5601	Quantitative Methods for Transport Analysis	Prof. J. M. S. J. Bandara Dr.H.L.K.Perera
CE5602	Systems and Operational Research Methods in Transport	Prof. J. M. S. J. Bandara
CE 5603	Road Safety, Social & Environmental Evaluations	Dr.H.R.Pasindu Prof.J.Manatunga Dr.(Mrs) T.W.K.I.M Dias Mr. S.H.U.De Silva
CE 5604	Project Management	Dr. Piyanuwana Perera Dr.Chandana Siriwardane
CE 5605	Traffic Management & Intelligent Transport Systems	Prof.J.M.S.J.Bandara Dr.G.L.D.I.De Silva Dr.H.L.K.Perera Dr.Ajith Pasqual Prof. Dileeka Dias Prof.Rohan Munasinghe
CE 5606	Highway Planning & Management	Dr.H.R.Pasindu
CE 5607	Transport Project Planning and Appraisal	Dr.H.R.Pasindu Dr.D.M.S.B.Dissanayake
CE 5619	Research Methods	Prof.J.M.S.J.Bandara Dr.H.L.K.Perera
CE 5620	Research Project I	Prof. W.K. Mampearachi Prof. J. M. S. J. Bandara Dr. H.R.Pasindu Dr. Dimantha De Silva Dr.H.L.K.Perera
CE 6601	Highway Construction & Maintenance Techniques	Prof. W.K. Mampearachi Dr. H.R.Pasindu
CE 6602	Traffic Engineering	Prof. J. M. S. J. Bandara Dr.H.L.K.Perera

Subject Code	Subject	Lecturer
CE 6603	Highway Infrastructure Design	Prof. W.K. Mampeararchchi
CE 6604	Geotechniques and Pavement Analysis	Prof. S.A.S. Kulathilake Prof. W.K. Mampeararchchi
CE 6611	Urban & Regional Transport Planning	Dr. Dimantha De Silva Dr.(Mrs).N.Sirisoma Dr. Amila Jayasinghe
CE 6612	Transport Demand Analysis	Dr. Dimantha De Silva
CE 6613	Public Transport Systems	Dr. Dimantha De Silva Dr (Mrs).N.Sirisoma
CE 6614	Transport Economics	Dr. H.R.Pasindu
CE 6631	GIS and Geomatics in Transport Planning	Dr.Amila Jayasinghe Dr.(Mrs).G.M.W.L.Gunawardhana
CE 6632	Railway & Airport Infrastructure	Dr.H.R.Pasindu Dr.V.Adikarivattage Mr.Chinthaka Jayasekera
CE 6633	Freight Transport & Logistics	Prof. J.M.S.J. Bandara Dr.I.Sigera Dr (Mrs).H.Liyanage
CE 6634	Advanced Methods in Road and airfield Infrastructure Design	Prof.I.R.A.Weerasekera Dr.R.L.H.L.Rajapaksha Dr.H.R.Pasindu Dr.S.Herath
CE 6635	Sustainable Transport Systems	
CE 6620	MSc/MEng Disseratation	Prof. W.K. Mampeararchchi Prof. J. M. S. J. Bandara Dr. H.R.Pasindu Dr. Dimantha De Silva Dr.H.L.K.Perera

7.3 Internal Lecturers

Name	Qualifications	Contact Details
<u>Department of Civil Engineering</u>		
Transportation Engineering Division		
Prof. J.M.S.J Bandara	BSc. Eng (Hons), PhD (Calgary), CMILT (UK)	Tel : 011 – 2650 301 ext 2129 Email : bandara@uom.lk
Prof.W.K.Mampearachchi	BSc. Eng (Hons), MSCE. (South Florida), PhD (Florida), CMILT (UK)	Tel : 011 – 2650301ext 2024 Email: wasanthak@uom.lk
Dr.H.R.Pasindu	BSc Eng (Moratuwa) , PhD.(NUS)	Tel : 011 – 2650 301 ext 2126 Email: pasindu@uom.lk
Dr. G.L.D.I.De Silva	B.Sc. Moratuwa Ph.D (Calgary)	Tel : 011 – 2650 301 ext 2127 Email: dimanthads@uom.lk
Dr.H.L.K.Perera	Ph.D (Uni Melb), M.Sc. (K-State,USA), B.Sc. Eng (Moratuwa), A. Dip. in MA (CIMA-UK), CEng., MIE(SL), CMILT, EIT (USA)	Tel : 011 – 2650301 ext 2219 Email: loshakap@uom.lk
Prof. S.A.S. Kulathilake	B.Sc.Eng.Hons (Moratuwa), Ph.D. (Monash), C.Eng., MIE(SL)	Tel : 011 – 2650 567 ext 2003 Email : sas@uom.lk
Prof. R.L.H.L. Rajapakse	BSc Hons. (Moratuwa), PhD(Japan), MSc(Japan), CEng, MIE-SL)	Tel : 011 – 2650301 ext 2116 Email : lalith@uom.lk
Prof. J.M.A. Manatunga	BSc Eng (Moratuwa), MSc (Galway), PhD (Saitama), CEng, MIE(SL)	Tel : 011 – 2650301ext 2018 Email: manatunge@civil.mrt.ac.lk
Dr. H.M.S.T. Herath	BSc Eng (Moratuwa), PhD (UK),AMIESL	Tel : 011 – 2650301 ext : Email : sumuduh@uom.lk
Dr.C. Siriwardana	BSc Eng (Moratuwa), MSc (Tokyo), PhD (Calgary)	Tel : 011 – 2650301 ext :2211 Email : chandanas@uom.lk
<u>University of Moratuwa</u>		
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Prof.(Mrs.) D. Dias	Ph.D(California) M.Eng.(California), B.Sc. Eng.(Moratuwa)	Tel : 011 – 640418 ext 3320 Email: dileeka@uom.lk
Prof. R. Munasinghe	Ph.D(Japan) M.Eng.(Japan), B.Sc. Eng.(Moratuwa), CEng,MIESL, MIEEE	Tel : 011 – 3640415 ext 3309 Email: rohan@uom.lk
Dr. Indika Sigera	B.Sc.(SL),M.Sc.(Sweden),Ph.D (Australia), MICS (UK), CMILT (UK), SEDA(UK).	Tel : 011 – 265 0492 ext 1153 Email: isigera@uom.lk

Dr. Y.M.M.S. Bandara	PhD (Australia), BA Economics (Special)	Tel : 11 2650398 ext:1158 Email: mahindab@uom.lk
Dr. V.V Adikariwattage	BSc Eng (Hons) (Moratuwa), MSc (Moratuwa), PhD (Calgary)	Tel : 11 2650398 ext:1158 Email: mahindab@uom.lk
Dr.Amila Jayasinghe	D.Eng, MPlan (Infrastructure), BSc(T&CP), MITP	Tel : 112650921 Email: amilabj@uom.lk
Dr.(Ms).G.M.W.L. Gunawardena	BSc (Hons) (Agriculture), M.Tech (RS & GIS) (India) PG Diploma (RS & GIS), M.Eng (Japan) PhD (Japan)	Tel : 11 2650921 Email: w.lakpriya@gmail.com
Dr.(Ms) H.L. Liyanage	PhD (UOSJ), MSc	Tel : 112650921 Email: harishani@uom.lk

7.4 Visiting Lecturers

Name	Qualifications
Dr. (Mrs.) R.M.N.T. Sirisoma	BSc (Eng.) (Moratuwa), PhD (Moratuwa).
Mr. S.H.U.De Silva	BSc.(Eng) (UoM), MSc.(REMV) (UoJ), MSc.(OUSL), PG Dip. (UoM),
Dr.(Mrs) T.W.K.I.M Dias	PhD (USA), MSc (Moratuwa), BSc Eng Hons (Moratuwa), AMIE(SL), AEng CMILT(SL)
Dr.D.M.S.B.Dissanayake	PhD (Andhara), MScDR(UOC), PG DHRA(UOC) PGDIR
Mr.V C D Jayasekara	MSc in Transportation (UOM), Engineering Council (UK) Examination (Part 1 and Part 2), C.Eng, MIET(UK),

8 Subject Outline M.Eng/PG Dip. in Highway & Traffic Engineering

CE 5601: Quantitative Methods for Transport Analysis

Probability Theory, Statistics, Random variables and expected values, Discrete probability distributions, Continuous probability distributions, Sampling distributions, Hypothesis testing, Regression analysis, Transport data collection, sampling techniques and analysis, Statistical software applications.

CE 5602: Systems and Operational Research Methods in Transport

Problem formulation, Method of calculus, Linear programming & Transportation problem, Dynamic programming, Network analysis, Decision theory, Game theory, Simulation techniques and Projects.

CE 5603: Road Safety, Social & Environmental Evaluations

Human factors & driver behavior, Road safety audit & conflict studies, Accident data collection & analysis, Accident investigations & safety management, Road safety appurtenance, EIA process in Sri Lanka, Environment issues related to transport projects; Social, ecological & economic. EIA methods & evaluation of alternatives, Air pollution & control, Planning & design for natural disasters and Case studies

CE 5604: Project Management

The Project Management Framework: Introduction to road sector Project Management. The project management context, Project management process, Project Integration Management, Project Scope Management.

Project Time Management: Activity definition, Activity sequencing, Activity duration estimation, Schedule development, Schedule control. Introduction to Computer software (MS Project)

Project Cost Management: Resource planning, Cost estimating, Cost budgeting and Cost controlling, and Earned value applications.

Project Quality Management: Quality planning, Quality assurance and Quality control

Project Communication Management: Communication planning, Information distribution, Performance reporting and Administrative closure. Project Risk Management: Risk identification, Risk quantification, Risk response development and Risk response control.

Project Procurement Management.

Preparation project reports using project management tools and techniques.

Introduction to Enterprise Project Management: Use of computer based tools such as MS Project Server, Primavera and Project.net (open source)

CE 5605: Traffic Management & Intelligent Transport Systems

Road signs & markings, Traffic calming and speed control, Traffic demand management & road pricing, Traffic impact assessment, Parking management, ITS applications User information systems, Managing non-motorized transport, Bus priority systems

CE 5606: Highway Planning & Management

Elements, functionality and performance and road classification/Road hierarchy

Network planning, Route planning criteria; design speed, access control, right of way

Data collection and map studies, Highway capacity design, level of service etc., Design concepts of road elements, Highway safety features & passing zones, Civil 3D application, Highway inventory, asset management, criterion of selection of roads for improvement or rehabilitation.

CE 5607: Transport Project Planning and Appraisal

Development of Transport Policy: international evolution, Sri Lanka; Attributes of Transport Policy: affordability, technology, employment, environment, safety, investment, subsidies, sustainability; Objectives of Planning : inputs into policies, strategies, short/medium/long term planning, urban/regional/national plans, development plans, corporate plans; The Planning Process: stages (problem, data, analysis, forecasting, generation of alternatives, evaluation, programming, implementation, monitoring, feedback; Theory of Transport Planning: economic, land use, systems; Application of Demand Estimation Models in Transport Planning: trip rates (attraction, generation), demand models and analysis, choice models, time series projections and modelling, land use models.

Process of Project Appraisal: Appraisal path, methodology, procedures and documentation, multi disciplinary analysis; Analysis of Costs and Benefits: unit costs: standards, variations; benefits, direct and external: types, norms and variations; Techniques of Economic Appraisal: cost benefit analysis, NPV, EIRR, Multi Criteria Ranking, Selection Criteria; Investment Analysis: risk analysis, sensitivity analysis, FIRR, evaluation of project proposals by private sector; Case Study.

CE 5619: Research Methods

Introduction to concepts of scientific research and research process, The framework and hypothesis generation, planning and design of research. Research proposal writing, Bibliography systems, Analysis and interpretation of data, Preparation of research and technical papers/ reports

CE 5620: Research Project 1

An individual project applying principals of highways and traffic engineering or transport planning. Such a project would in general require the collection of data, analysis and conclusions for a transportation problem or project given as a research title.

The Final report and the presentation should be comprehensive including all

technical, analytical, social and economic dimensions of the given project title

CE 6601: Highway Construction & Maintenance Techniques

construction materials; aggregate and bitumen, Construction techniques; subgrade, subbase, base & shoulders, Asphalt mix design, Asphalt production, Asphalt delivery, placement & compaction, Super pave technology, Type of failures and condition assessment, Pavement evaluation – nondestructive testing, Surface treatments, Overlay construction consideration, Maintenance program, Pavement Management System.

CE 6602: Traffic Engineering

Traffic flow theory, Traffic flow models, Traffic flow analysis, Intersection controls / interchanges, Roundabout design, Traffic signal design, Traffic signal coordination Incident analysis, Queuing theory

CE 6603: Highway Infrastructure Design

Geometric design; design control criteria, Design of curves, Pavement design concepts / TRL method, Pavement Design ASSHTO, Concrete technology & mix design, Rigid pavement design, Pavement joint design Pavement overlay design, Rigid pavements, Block paving / composite pavements, Design of sidewalks, pedestrian crossings, cycle lanes, road lighting, and road furnitures:

CE 6604: Geotechniques and Pavement Analysis

Basic soil properties and soil tests, Site investigation for highways, ground improvements for highways, Slope stability analysis and stabilization techniques, Earth retaining structures, Flexible pavement analysis, Rigid pavement analysis, Use of software for pavement analysis, and student Projects.

CE 6611: Urban and Regional Transport Planning

Historical development, functional and organizational structure, transport regulations, Mobility, accessibility & sustainability, Land use theory, Transport land use linkage, Urban characteristics: Classification of urban centers, growth pattern, business migration, Characteristics of urban transport systems, Urban transit system & technologies, Planning of transport networks, Case study

CE 6631: GIS and Geomatics in Transport Planning

Introduction to Geographical Information Systems and its engineering applications, Use of GIS software in data analysis, decision making and presentation, Preparation of maps and geographical databases using aerial photogrammetry, remote sensing GPS and ground surveying techniques, Use of GIS in the feasibility and EIA studies in planning new transportation routes, Use of spatial analysis capabilities in transportation planning, Solutions for transport networks using GIS

CE 6632: Railway & Airport Infrastructure

Tracks & yards, Stations and related facilities, Scheduling and signaling & communication, Security and passenger services, Railway freight operation, Alternate and advanced rail systems – LRT/MRT/Monorail,

Airport layout and capacity, Runways, taxiways and aprons, Airport terminal facilities, Other airport facilities – hangers, freight, catering, fire fighting, meteorology etc, Airport terminal layouts, Passenger processing and baggage handling:

CE 6633: Freight Transport and Logistics

Logistics concepts, Freight Transport: Road, Rail, Sea and Air features, development, technology; Warehousing and Material Handling: Loading and unloading facilities, costs, designs, vehicle designs, storage; Distribution Strategies: Networks, collection-distribution systems; Marketing of Transport Services, Location Theory, ITS and freight transport systems

CE 6634: Advanced Methods in Road and airfield Infrastructure Design

Surface/ subsurface drainage design, Cross drainage design, Bridge classification / investigation for bridge work, Bridge loading, Bridge design criteria, Bridge inspection & management system, bridge assessment and strengthening methods, Aircraft loading, and design vehicles, Runway Geometric and Pavement design.

CE 6635: Sustainable Transport Systems

Nature of Travel Needs: trip purposes, trip rates, needs of woman, elderly and children,; Transport connectivity; Sustainable transportation policies, and technologies; Bicycles & Pedestrian: requirement, lanes, paths and clear walkways, vehicle-free city planning , pedestrian and bicycle friendly design; Alternative energy options for transport.

9 Subject Outline for MSc/PG Dip. in Transportation

CE 5601: Quantitative Methods for Transport Analysis

Probability Theory, Statistics, Random variables and expected values, Discrete probability distributions, Continuous probability distributions, Sampling distributions, Hypothesis testing, Regression analysis, Transport data collection, sampling techniques and analysis, Statistical software applications.

CE 5602: Systems and Operational Research Methods in Transport

Problem formulation, Method of calculus, Linear programming & Transportation problem, Dynamic programming, Network analysis, Decision theory, Game theory, Simulation techniques and Projects.

CE 5603: Road Safety, Social & Environmental Evaluations

Human factors & driver behavior, Road safety audit & conflict studies, Accident data collection & analysis, Accident investigations & safety management, Road safety appurtenance, EIA process in Sri Lanka, Environment issues related to transport projects; Social, ecological & economic. EIA methods & evaluation of alternatives, Air pollution & control, Planning & design for natural disasters and Case studies

CE 5604: Project Management

The Project Management Framework: Introduction to road sector Project Management. The project management context, Project management process, Project Integration Management, Project Scope Management.

Project Time Management: Activity definition, Activity sequencing, Activity duration estimation, Schedule development, Schedule control. Introduction to Computer software (MS Project)

Project Cost Management: Resource planning, Cost estimating, Cost budgeting and Cost controlling, and Earned value applications.

Project Quality Management: Quality planning, Quality assurance and Quality control

Project Communication Management: Communication planning, Information distribution, Performance reporting and Administrative closure. Project Risk Management: Risk identification, Risk quantification, Risk response development and Risk response control.

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Preparation project reports using project management tools and techniques.

Introduction to Enterprise Project Management: Use of computer based tools such as MS Project Server, Primavera and Project.net (open source)

CE 5605: Traffic Management & Intelligent Transport Systems

Road signs & markings, Traffic calming and speed control, Traffic demand management & road pricing, Traffic impact assessment, Parking management, ITS applications User information systems, Managing non-motorized transport, Bus priority systems

CE 5606: Highway Planning & Management

Elements, functionality and performance and road classification/Road hierarchy

Network planning, Route planning criteria; design speed, access control, right of way

Data collection and map studies, Highway capacity design, level of service etc., Design concepts of road elements, Highway safety features & passing zones, Civil 3D application, Highway inventory, asset management, criterion of selection of roads for improvement or rehabilitation.

CE 5607: Transport Project Planning and Appraisal

Development of Transport Policy: international evolution, Sri Lanka; Attributes of Transport Policy: affordability, technology, employment, environment, safety, investment, subsidies, sustainability; Objectives of Planning : inputs into policies, strategies, short/medium/long term planning, urban/regional/national plans, development plans, corporate plans; The Planning Process: stages (problem, data, analysis, forecasting, generation of alternatives, evaluation, programming, implementation, monitoring, feedback; Theory of Transport Planning: economic, land use, systems; Application of Demand Estimation Models in Transport Planning: trip rates (attraction, generation), demand models and analysis, choice models, time series projections and modelling, land use models.

Process of Project Appraisal: Appraisal path, methodology, procedures and documentation, multi disciplinary analysis; Analysis of Costs and Benefits: unit costs: standards, variations; benefits, direct and external: types, norms and variations; Techniques of Economic Appraisal: cost benefit analysis, NPV, EIRR, Multi Criteria Ranking, Selection Criteria; Investment Analysis: risk analysis, sensitivity analysis, FIRR, evaluation of project proposals by private sector; Case Study.

CE 5619: Research Methods

Introduction to concepts of scientific research and research process, The framework and hypothesis generation, planning and design of research. Research proposal writing, Bibliography systems, Analysis and interpretation of data, Preparation of research and technical papers/ reports

CE 5620: Research Project 1

An individual project applying principals of highways and traffic engineering or transport planning. Such a project would in general require the collection of data, analysis and conclusions for a transportation problem or project given as a research title. The Final report and the presentation should be comprehensive including all technical, analytical, social and economic dimensions of the given project title

CE 6611: Urban and Regional Transport Planning

Historical development, functional and organizational structure, transport regulations, Mobility, accessibility & sustainability, Land use theory, Transport land use linkage, Urban characteristics: Classification of urban centers, growth pattern, business migration, Characteristics of urban transport systems, Urban transit system & technologies, Planning of transport networks, Case study

CE 6612: Transport Demand Analysis

Type of transport data, field surveys, data analysis, data bases, introduction to demand forecasting; cost functions – fixed & variable costs, introduction to transport demand models, Method of transport demand analysis, Economic theory and modeling, Variables in models, Choice models, Application of models, Calibration of demand models,

Transport demand analysis: Trip generation, Trip attraction, Trip distribution, and Trip assignment and a Case study

CE 6613: Public Transport Systems

Transit technologies, Routes & services, Stops & terminals; location & design aspects, Network planning, Scheduling, time tables and crew assignment, Transit fares & fare collection systems, Information systems, Route lengths & feeder systems, Performance indicators and monitoring.

CE 6614: Transport Economics

Introduction to Micro-economic theory: introduction, supply function, demand function, price equilibrium; Transport & the economy: contribution to GDP, public investment; Transportation in Society; issues: affordability, equity, opportunity, environment; The Demand for Transport: The cost function, the choice function; Transport Costs: transport costs, fixed and variable costs, indivisible costs, subsidies, consumer surplus, Shadow prices. Peak load prices; Subsidies in Transport: direct, cross-subsidies; Benefits from Transport Services: identification of types, quantification and estimated values of user benefits, vehicle operating costs, value of time benefits; Transport and externalities: Impacts, and cost estimates, congestion, accidents, regional development and pollution

CE 6631: GIS and Geomatics in Transport Planning

Introduction to Geographical Information Systems and its engineering applications, Use of GIS software in data analysis, decision making and presentation, Preparation of maps and geographical databases using aerial photogrammetry, remote sensing GPS and ground surveying techniques, Use of GIS in the feasibility and EIA studies in planning new transportation routes, Use of spatial analysis capabilities in transportation planning, Solutions for transport networks using GIS

CE 6632: Railway& Airport Infrastructure

Tracks & yards, Stations and related facilities, Scheduling and signaling & communication, Security and passenger services, Railway freight operation, Alternate and advanced rail systems – LRT/MRT/Monorail,

Airport layout and capacity, Runways, taxiways and aprons, Airport terminal facilities, Other airport facilities – hangers, freight, catering, fire fighting, meteorology etc, Airport terminal layouts, Passenger processing and baggage handling:

CE 6633: Freight Transport and Logistics

Logistics concepts, Freight Transport: Road, Rail, Sea and Air features, development, technology; Warehousing and Material Handling: Loading and unloading facilities, costs, designs, vehicle designs, storage; Distribution Strategies: Networks,

collection-distribution systems; Marketing of Transport Services, Location Theory, ITS and freight transport systems

CE 6635: Sustainable Transport Systems

Nature of Travel Needs: trip purposes, trip rates, needs of woman, elderly and children;; Transport connectivity; Sustainable transportation policies, and technologies; Bicycles & Pedestrian: requirement, lanes, paths and clear walkways, vehicle-free city planning , pedestrian and bicycle friendly design; Alternative energy options for transport.

10 Individual and Group Assignments

10.1 Assessed Work

Assessment of course work is an important part of the course. Fair assessment of course work requires that the work submitted by a student is his or her alone, unless group working is explicitly authorised. All sources should be referenced and quotations should be acknowledged when work is submitted for assessment. Collusion and plagiarism in assessed work are serious offences under University Regulations and can lead to expulsion from the course. When submitting work, students may be required to sign an undertaking to the effect that the work submitted represents only their own work.

Assignments should be handed into the Department by the given deadline. If you feel that you are unable to submit your assignment by the given deadline, you must notify the Course Co-ordinator immediately. Medical evidence will normally be required to establish a valid reason for late submission. Unless an extension is agreed by the Module Co-ordinator, your work will be penalised by a deduction of one mark per day up to a maximum of 10 days, after which a mark of zero will be returned.

Assignments should bear a cover page which will include academic year, name of student, name of the module, names of module co-ordinators and lecturer and the assignment title. *Sample Assignment Cover Page is shown in Annex A*

There will be clear guidelines from the module co-ordinator at the beginning of the module regarding the overall assessment process; the rubric of the examination and the purpose and nature of each coursework assignment within the overall assessment process. For each assignment you will be informed of: title, maximum/minimum length, contribution to the overall assessment, deadline for the submission, explanatory rubric, ancillary materials and reading guidelines etc.

10.2 Materials Sourced from Internet

Sourcing a document from the World Wide Web (WWW) does not mean it has academic credibility. Anyone can publish on the WWW, and materials sourced in this way can have no more value than hearsay, opinion or assertion. However, an increasing number of academically respectable articles, whole journals and news papers are being published on the WWW. If you wish to cite materials from the WWW, you must include in your bibliography the URL enabling the marker to find it, together with a brief explanation of why you feel the work has academic credibility. A Lecturer has the right to request you to produce a copy of the article as well as a reference to it.

10.3 Structure of Reports and Essays

In assignments requiring a report, students should always adopt the following common structure unless explicitly given an alternative structure by the lecturer.

10.3.1 A Common Report Structure:

- **Title Page:** Keep the title short and punchy. Use a subtitle if necessary to explain the title.
- **Executive Summary:** The executive summary explains what the report is about (The aims and objectives are summarised, the methodology used, the major findings or results given and recommendation listed where relevant)
- **Contents; List of Figures & Tables:** The contents list must have a page number for each section. This is particularly important for long pieces of work.
- **Introduction:** The introduction gives the background to the work, and lays down the aims and objectives, the scope and boundaries, with reasons.
- **Main Body:** Keep the main body of the report readable and interesting. Try not to spoil the flow with statistics and tables which may be important and necessary but which does not add to the reader's understanding. Relegate them to the appendix. Analyse logically and critically. Point out conflicting arguments and inconsistencies from your readings with explanations where possible. Point out which readings are relevant and which are not to your particular situation. Draw any inferences from this.
- **Sections/Chapters:** Make the conclusions clear and sharp so that they follow logically from the analysis. Use bullet points if necessary. Make sure you have achieved your objectives, and where you have not, explain why not. Think carefully about the presentation of data. Make it simple and easy to understand. Tables of numerical data are often easier to use than graphs, but graphs have greater impact. Be sure to use the right type of graph for the data set.
- **Conclusions/Recommendations:** Do not be afraid to express your own, informed opinions in the conclusions and recommendations. This is not assertion, provided you are backing it with reasoned arguments based on the literature and any other research you may have executed during the work. Explain how your findings might be applied.
- **References:** Standard Harvard Style referencing procedures should be followed.
- **Appendices:** Do not clutter the report with irrelevant materials in the appendices. Use them to prove your **contribution** and to assist in the understanding of the subject.

10.3.2 Essay Type Assignment

Essays are more appropriate for discursive assignments. They also should have a structure. There is no prescribed structure as such, but there is a simple and effective way to structure an essay which you are advised to adopt:

- Interpret the title, explain alternative interpretations and explain why you are tackling the topic your way.
- Introduce and critically discuss the materials you have selected.
- Use your material to argue your points and draw your conclusions.

- Do not ramble aimlessly or introduce interesting but irrelevant material.
- Try to be concise.
- Summarise your findings and make any consequent recommendations.
- References and Bibliography.

10.3.3 Presentation of Assignments and Plagiarism

Always use a word processor to compile your reports and proof-read the final work before submission. Always paginate an assignment. It is your responsibility to keep a copy of every assignment.

The University Regulations require students to submit their own original work for essays, reports, exercises and examinations. Stress is laid on the consequences of plagiarism and the use of other unfair means in examinations, be they coursework or end of semester examinations.

Some examples of plagiarism are:

- Asking someone else to write all or part of an essay.
- Copying all or part of someone else's essay, with or without the other person's knowledge.
- Using quotations or ideas from the work of others which are not acknowledged.
- Working jointly with another student on an essay and then copying it up for individual submission.
- Taking materials from the Internet and passing it off as your own.
- Summarising a range of sources as if you had read them yourself, when in fact you are using someone else's summary.

There is no objection to quoting materials from other sources. In fact, it is in academic writing to quote materials selectively from journals and even textbooks, but it is very important that you acknowledge and identify all source materials on which your assignment work is based. Of course a piece of work that is made almost entirely of other people's ideas with little input from you is likely to be awarded a rather low grade.

Any quotations should always be attributed by means of quotation marks and a reference naming author and text. Remember that quotations and references should be used in support of an argument, or to make a point, and not to provide the substance or main part of the work to be submitted for assessment.

If you do not clearly identify your sources you might be suspected of plagiarism. If an examiner finds that you have presented someone else's work as your own the consequences can be very serious.

10.4 Procedure for Assignments Involving Group Work

All students accept the need for working in groups, and the benefits to be gained from the transfer of work experience and other practices through group working. However, there have been recurring complaints from some researchers that these benefits are not being realised where students are able to choose their own grouping. This problem can be tackled both through the process of group formation and the method of assessment. The following

procedure for group formation will take place unless otherwise agreed with the module co-ordinator.

10.5 Group Formation

10.5.1 Objectives

- To maximise the opportunities for each student to benefit from the transfer of work experiences and practices with other students through the assignment medium;
- To create opportunities for students to make lasting networking ties with each other;
- To make the work sharing process as fair as possible.

10.5.2 Process

- Module Lecturers should select student groups for assessed assignments, not the students.
- Groups should be chosen by quasi-random selection, resulting in each group containing a mix of students differentiated as far as feasible by such factors as age, gender, level and type of experience.
- New groups should be formed for each different piece of group-work.
- Students' preferences should only be granted where the teacher is satisfied that there is a logistical problem that threatens the functionality of the group.

10.5.3 Group-work Assessment

When a group project is submitted, a separate section should be included in which each member of the group briefly describes his/her contribution to the project. If the group wishes to receive same marks for everybody or marks according to the contribution, this should be stated in the assignment.

11 Project and Research Dissertation

The Third Semester of this course is mostly dedicated for the Masters preparation of a research dissertation. This is a written report on an original and individual project undertaken by the student, which will be assessed by a panel of examiners. Students are encouraged to think about their projects early in the academic semesters for efficient execution of the project.

The course Co-ordinator will circulate a list of possible supervisors and their areas of research interests. Students then approach an appropriate supervisor to discuss their project proposals. Students wishing to undertake a project within a firm / organization are responsible for organising their own placements. But course Co-ordinator can issue a letter to facilitate it. Special forms relevant to the research dissertation will be issued during the third semester.

11.1 Types of Project

- a) A student may attempt to solve a practical problem (not necessarily a successful attempt). The dissertation may demonstrate the ability to put to practical use of some of the techniques learned on the course.
- b) Some students may be engaged by a company to do a specified job in a specified time: they may need to put the work they do in a wider perspective.
- c) Under exceptional circumstances a student may be allow to carryout a portfolio of smaller research projects involving data collection, analysis and the drawing of conclusions.
- d) Students are highly encouraged to select a dissertation topic according to their specialisation track.

11.2 Supervision

Students cannot expect their projects to be minutely supervised by their supervisors, but they can expect reasonable access to staff members. In particular, they can expect the supervisor to help if they get in to severe difficulty. However, it is better to have regular contact with your supervisor to avoid this. It is the joint responsibility of supervisor and student to agree early on the programme of work for the project. All projects should have a written statement of the plan of the project and the various stages through which it is expected to pass. Students may of course, approach other members of staff than their supervisor for specialist advice on particular matters in their projects.

A supervisor will usually be able to tell the student when it is time for the student to begin the final write-up. However, you are advised to begin writing frameworks for chapters and chapters as early as possible.

Supervisors will be keeping a log of the progress of students and a suitable format is suggested below. This procedure is intended to improve consistency between supervisors,

give sufficient information to understand the requirements of each stage, assists in the keeping of a log of deadlines and contacts with the supervisor and student.

11.3 General Academic Standard of a Masters Thesis

A M.Eng./M.Sc. Thesis should show:

- The ability to identify a problem and define it in such a way that it can be satisfactorily completed in the time available.
- Logical analysis and development of the issues involved in the problem.
- Thorough knowledge of the area of study.
- Understanding of the methodological issues involved.
- Ability to interpret and assess the findings.
- Ability to relate the findings to the issues identified in the problem.
- APP or IEEE reference styles available in the library website (www.lib.mrt.ac.lk)
- An acceptable level of use of English language.

You are advised to make clear the theoretical framework for your thesis, the methodology that you have adopted, and the conclusions that you have drawn. You should also indicate what contribution your thesis has made, e.g. to the theory you have studied, and/or to the company with which you have worked. Finally, you should consider how the project and thesis have helped in your personal learning and development.

11.4 Thesis Guideline

- Thesis guideline recommended by the University of Moratuwa is given below. website (www.lib.mrt.ac.lk)

1. A thesis/dissertation should contain the following parts in the given order.

- 1.1. Cover
- 1.2. Title page
- 1.3. Declaration page of the candidate & supervisor
- 1.4. Abstract
- 1.5. Dedication (if any)
- 1.6. Acknowledgements
- 1.7. Table of contents
- 1.8. List of figures (if any)
- 1.9. List of tables (if any)
- 1.10. List of abbreviations (if any)
- 1.11. The body of the thesis/dissertation
- 1.12. Reference list
- 1.13. Bibliography (if any)
- 1.14. Appendices (if any)

1.1. Cover

A sample cover page is available in Appendix I.

1.2 Title Page

First page should be the title page . It should contain;

- The title & sub title of the thesis/ dissertation
- Candidate's full name
- University registration number
- Official name of the degree to which the thesis/ dissertation is submitted
- Official name of the department of the university
- The month and year of submission

1.3. Declaration, copyright statement and the statement of the supervisor

The following declaration should be made by the candidate following the signature and the date. A candidate, after a discussion with the supervisor/s can request an embargo for a particular thesis/dissertation for a given work for a given time or indefinitely. Such an embargo may override the statement made in the thesis/dissertation itself.

"I declare that this is my own work and this thesis/ dissertation¹ does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature:

Date:

The supervisor/s should certify the thesis/dissertation with the following declaration.

The above candidate has carried out research for the Masters/MPhil/PhD thesis/ Dissertation under my supervision.

Signature of the supervisor:

Date

1.4. Abstract

Every copy of the thesis/dissertation must have an abstract. Abstracts must provide a brief introduction to the subject in addition to the concise summary of methodology, tests, results, conclusions and recommendations (300 words or less).

It should also accompany a list of keywords (3-5), which could improve the accessibility of the thesis/dissertation in an online environment.

Abstract Title : Title case/Times New Roman 12 point Bold (If use other fonts, change the size appropriately)

Text : Times New Roman 11 point Light.

Spacing : Single line

1.5. Dedication

May be included if desired.

1.6. Acknowledgement

In the acknowledgement section, the student is required to declare the extent of assistance which has been given by his/her faculty/department staff, fellow students & external bodies or others in the collection of materials and data, the design & construction of apparatus, the analysis of data and preparation of the thesis/dissertation. If the research was sponsored, it is necessary to mention the name of the funding organization and other details (if any). In addition, it is appropriate to highlight the supervision and advice given by the thesis/dissertation supervisor.

1.7. Table of contents

All the main chapters and subsections of each chapter must be included in the table of contents with their page numbers. The page numbers of abstracts, acknowledgement and others which come first in the thesis/dissertation should also be included. Also, if there are any appendices and other addenda, should be included in the table of contents.

1.8. List of figures

If the thesis/dissertation contains any figures then separate list should be prepared including the name of the object and the page number. The chapter number should be included in defining the number of figures.

1.9. List of tables

If the thesis/dissertation contains any tables then separate list should be prepared including the name of the object and the page number. The chapter number should be included in defining the number of tables.

1.10. List of abbreviations

Abbreviations must follow the International standards. When an abbreviation is used in first time, it must be explained in the text. A separate list should be prepared for all abbreviations used in thesis/dissertation with their full meaning. The abbreviations in the list should be arranged according to the alphabetical order.

1.11. The body of the thesis/dissertation

The thesis/dissertation should be started from an introduction and the last part of the thesis/dissertation should include the conclusions and recommendations. All the chapters of thesis/dissertation should have title and a chapter number. Any new chapter should be started from a new page.

1.12. Reference list

A reference list² is the list of all books, articles, and other source of materials, which were referred and should be listed according to the international referencing method adopted. APA Style and IEEE Style are recommended.

Each reference entry should be single-spaced with double spacing between entries.

The 'Reference list' does not contain a chapter number.

1.13. Bibliography (if any)

1.14. Appendices

Supplementary material could be included as Appendices rather than in the main text. For example, Appendices may contain questionnaires, detailed descriptions on apparatus, extensive tables of raw data, computer programs, etc. All appendices must have page numbers written in the same typeface and size used for pagination throughout. If appendices contain photocopied material, the photocopies should be of letter quality.

11.5 Chapter breakdown of the Thesis

The following Chapter breakdown is suggested, but **need not be strictly adhered to**:

- CHAPTER 1: INTRODUCTION

The Background to the problem should be highlighted, indicating why the problem is important and why it warrants the proposed study.

Definition of the main problem/research question and identification of objectives.

This should be then sub divided into several sub-research problems/questions.

A brief method of study adopted. Brief review of the previous literature attempts should be made to highlight similarities and differences between the proposed work and previous studies.

This should then be followed by the researcher's expected results from the study.

- CHAPTER 2: LITERATURE REVIEW

- Detailed Literature review should be included.

- CHAPTER 3: METHODOLOGY OF STUDY

Detailed analysis of the methodology adopted for the study with frequent references to the research problems/ questions identified in chapter one.

Reasons for choosing the current methods of study should be discussed, explaining why other alternative methods have not been adopted.

- CHAPTER 4: OBSERVATIONS/RESULTS/DATA ETC.

A summary of results should be provided.

- CHAPTER 5: ANALYSIS AND DISCUSSION OF RESULTS

Discuss the findings of the study in detail.

- CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This chapter should contain an overall summary with the conclusions drawn from the work. In the conclusions section a reference should be made to the problems identified in Chapter One indicating the extent to which these questions have been answered in the dissertation.

The guideline for thesis preparation is available at the Division of Post Graduate at Faculty of Engineering, University of Moratuwa. The final copies of the thesis will not be accepted if the students have not prepared the thesis according to the University guideline

N.B: Further Information/Guidelines related to the research dissertation/report such as supervision, layout, format, submission, etc can be obtained from the Course Coordinator at the relevant time.

12 Performance Criteria for the Award of Degree

Title of Award:

- A - Master of Engineering (Highway & Traffic Engineering) / Post Graduate Diploma in Highway & Traffic Engineering
- B - Master of Science (Transportation)/ Post Graduate Diploma in Transportation

Scheme of Examination:

A candidate is deemed to have passed the Master of Engineering/Master of Science degree if he/she has

- a) Written examination(s).
- b) Seminars, where appropriate
- c) Assignments, where appropriate
- d) Examination of the dissertation and oral examination

Where the overall mark assigned for a subject consists of written examination marks as well as marks assigned for any subject related coursework, the candidate shall obtain at least 50% of the overall marks with a minimum of 40% of the marks assigned for each component of that subject.

If the student is unsuccessful in any of the parts (a, b, c, d), the student may be re-examined. Normally only one re-examination will be allowed, and this shall be at the next holding of the examination(s)/assessment(s). No postponement shall be allowed without prior approval of the Senate

Award of Classes:

Classes will not be awarded. Grading as follows will be shown in the transcripts.

Guideline Percentage	Grade	Grade point	Description
85 and above	A ⁺	4.2	
75 to 84	A	4.0	Excellent
70 to 74	A ⁻	3.7	
65 to 69	B ⁺	3.3	
60 to 64	B	3.0	Good
55 to 59	B ⁻	2.7	
50 to 54	C ⁺	2.3	Pass ^(a)
	I	0.0	Incomplete ^(b)
	F	0.0	Fail ^(c)

A student who repeats a subject will get only a maximum of a C⁺ grade.

Determination of results of P.G. Diploma:

A candidate is deemed to have passed the PG Diploma Degree if he/she has

- Successfully completed written exams for all forty credits as specified under section 6.
- Successfully completed all assignments, seminars

Determination of results of M.Eng./M.Sc. Degree:

A candidate is deemed to have passed the Master of Engineering/Master of Science degree if he/she has

- Successfully completed written exams for all forty credits as specified under section 6.
- Successfully completed all assignments, seminars
- Examination of the thesis and oral examination

Attendance of Requirement:

At least 80% of the attendance for lectures, seminars, tutorials, field trips etc.

Date of Award:

- *Post Graduate Diploma*

First day of the month following the successful completion of the last written or oral examination.

- *M.Eng./M.Sc. :*

First day of the month following the successful completion of the research project.

Duration of Course

The normal duration of the course shall be 21 to 24 months for part-time students. All lectures, assignments, practical, seminars, field trips, etc. will be normally conducted on Fridays and Saturdays.

