

### Performance Criteria

Title of Award : Master of Engineering (Highway & Traffic Engineering)

### Course Structure

At least 60 credits from the following list (45 credits from core module & 15 credits from elective module)

### Scheme of examination:

To pass a module, student should obtain a minimum mark of 40% in each of the continuous assessment & final examination component of the module and an overall minimum grade of C<sup>+</sup> or above

### Grades:

Grading as follows will be shown in the transcripts.

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

A student who repeats a subject will get only a maximum of a C<sup>+</sup> grade. Classes will not be awarded.

### Determination of results of P.G. Diploma:

A pass in all subjects as per Course structure

### Determination of results of M.Eng. Degree:

Eligibility for P.G. Diploma as given above and a pass in the research project.

### Attendance of Requirement:

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

### Date of Award

### M.Eng. :

First day of the month following the successful completion of all academic requirements

### Head of the Department

Prof. W.P.S. Dias

### Transportation Engineering Division Academic Staff

Prof. L.L. Ratnayake  
B.Sc.(Eng) M.Sc.(B'ham), C.Eng., FIE(SL), CMILT

Prof. J.M.S.J. Bandara  
B.Sc.(Eng) , Ph .D. (Calgary), FCILT

Dr. W.K.Mamppearachchi  
B.Sc.(Eng) , MSCE (S.Florida),Ph .D. (Florida), CMILT, AMIE (SL)

### Duration of Course

Master of Engineering/Science - 2 years Part Time or 15 months Full Time. All Lectures, assignments, seminars, field trips etc., will be conducted normally on Fridays and Saturdays.

Those who proceed to do the M. Eng. Will be requested to do a research project on part time or full time basis in the second year.

### Eligibility Requirements

- B.Sc. Eng. degree of the university of Moratuwa, Sri Lanka in relevant field as judged by the faculty and approved by the senate; or
- Any other engineering degree in a relevant field equivalent to (a) above as judged by the faculty and approved by the senate; or
- An equivalent professional qualification, with at least one year experience in a relevant field, after obtaining such qualifications, the recognition of the institute and the relevance of the field for this purpose shall be judged by the faculty and approved by the senate.

### Course Fees

M.Eng. (2 years) : Rs. 150,000/=

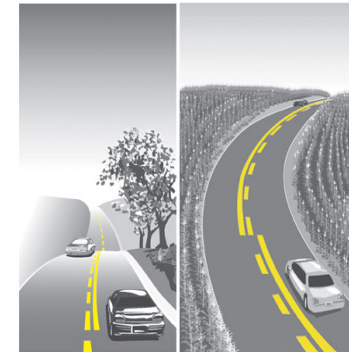
### Other Fees

Rs. 1000/= Registration fees for the first year, Rs. 5000/= refundable deposit (library facilities) and Rs. 500/= Exam Fees payable at registration and Rs. 500/= registration fee for second year.

### Application:

Closing date for applications is 12<sup>th</sup> January 2010 Completed application forms should be sent to: **Course Co-ordinator, PG Course in Highway & Traffic Engineering, Dept. of Civil Engineering, University of Moratuwa, Moratuwa.**

# POSTGRADUATE DIPLOMA / M.ENG. IN HIGHWAY & TRAFFIC ENGINEERING 2010/2011



DEPARTMENT OF CIVIL  
ENGINEERING  
UNIVERSITY OF  
MORATUWA

# Syllabus

## COMPULSARY SUBJECTS

### Highway Construction & Maintenance Techniques

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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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 furniture.

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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

**Credits: 3      Continuous Assessment: 50 ± 10      Final Exam: 50 ± 10**

### 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

**Credits: 3      Continuous Assessment: 50 ± 10      Final Exam: 50 ± 10**

### 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

**Credits: 3      Continuous Assessment: 40 ± 10      Final Exam: 60 ± 10**

### Project Management

The Project Management Framework, Project Time Management, Project Cost Management, Project Quality Management, Project Communication Management, Project Risk Management, Project Procurement Management, Preparation project reports using project management tools and techniques, Introduction to Enterprise Project Management.

**Credits: 3      Continuous Assessment: 40 ± 10      Final Exam: 60 ± 10**

### 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

**Credits: 1      Continuous Assessment: 100**

## Research Project I

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

**Credits: 3      Continuous Assessments: 100**

## ELECTIVE MODULES

### 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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### Transport Project Planning and Appraisal

Attributes of Transport Policy, Development of Transport Policy, Objectives of Planning, The Planning Process, Application of Demand Estimation Models in Transport Planning, Process of Project Appraisal, Analysis of Costs and Benefits, unit costs, benefits, direct and external, Techniques of Economic Appraisal, Investment Analysis

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### Urban & 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

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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.

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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.

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### Freight Transport & 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.

### 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, Runaway Geometric and Pavement design.

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**

### 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.

**Credits: 3      Continuous Assessment: 30 ± 10      Final Exam: 70 ± 10**