



Department of Civil Engineering  
University of Moratuwa

# Master of Science in **TRANSPORTATION** 2021/2022

The transportation industry is currently undergoing an unprecedented expansion fuelled by worldwide economic growth and there is an expanding need for highly skilled transportation professionals. The M.Sc. degree in Transportation is a highly valued qualification and graduates can expect to pursue careers in a range of organisations in the world.

The programme intends to provide students from a wide range of backgrounds, a firm grounding in the principles, techniques, issues and practice of highway and maintenance, thus equipping them for a professional career. The programme is hosted by the Transport Engineering Division (TED) of the Department of Civil Engineering, University of Moratuwa.

This year onwards, TED is reaching another milestone by offering this program to offshore students (Sri Lankan citizens in foreign countries as well as all foreign students), especially providing an opportunity to students who are working overseas. This creates a platform for global level knowledge sharing and discussions in the class, leading to more knowledgeable graduates.

All lectures, assignments, evaluations, etc. will be carried out using online (hybrid) platforms.



# Master of Science in TRANSPORTATION 2021/2022



Department of Civil Engineering  
University of Moratuwa



## ■ TITLE OF AWARD

---

Master of Science in Transportation

## ■ ELIGIBILITY REQUIREMENTS

---

B.Sc. Eng. degree of the University of Moratuwa, or any other recognized University in a relevant field as judged by the faculty and approved by the senate;

or

A special degree in a relevant field with one year appropriate experience, after obtaining such qualifications, the recognition of the institute & the relevance of the field for this purpose shall be judged by the faculty & approved by the senate;

or

A general degree in a relevant field with two years appropriate experience, 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.

or

An equivalent professional qualification with at least two years' 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.

## ■ DURATION OF COURSE

---

Master of Science - 2 years Part Time

All Lectures, assignments, seminars, field trips etc., will be conducted on Fridays(afternoon) and Saturdays via online(hybrid).

## ■ COURSE FEES

---

Rs. 300,000/=(Sri Lankan citizens only)  
*Foreign students please contact course coordinator*

Rs. 1500/= Registration fees,

Rs. 5000/= Refundable deposit (library facilities) and

Rs. 500/= Exam Fees payable at registration

## ■ TENTATIVE START DATE

---

First week of November 2021

## ■ APPLICATION

---

Application forms can be downloaded from the website :  
<https://uom.lk/civil/divisions/transportation/pg-course>

### Application closing date:

22<sup>nd</sup> July, 2021

Completed application forms should be sent to:

[pg-ted@uom.lk](mailto:pg-ted@uom.lk)

For more information, contact the course coordinator on  
[loshakap@uom.lk](mailto:loshakap@uom.lk) or on extension 2219.

# Master of Science in TRANSPORTATION 2021/2022



Department of Civil Engineering  
University of Moratuwa

## SYLLABUS

### CORE MODULES

Subject	Content	Credits
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	3
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 modelling, 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	3
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.	3
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.	3
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	3
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	3
Road Safety, Social & Environmental Evaluations	Human factors & driver behaviour, 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	3
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.	3
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	1
Research Project <sup>1</sup>	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	3
MSc Dissertation <sup>2</sup>	An individual research 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	20

<sup>1</sup> Will be offered only for PG Diploma in Transportation

<sup>2</sup> Will be offered only for MSc in Transportation

### ELECTIVE MODULES

Subject	Content	Credits
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	3
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	3
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.	3
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.	3

### OPTIONAL MODULES\*

Subject	Content	Credits
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	3
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	3
Railway & Airport Infrastructure	Tracks & yards, Stations and related facilities, Scheduling and signalling & 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, firefighting, meteorology etc, Airport terminal layouts, Passenger processing and baggage handling.	3

\* Optional modules will be offered as elective modules for MSc in Transportation



# Master of Science in **TRANSPORTATION** 2021/2022



Department of Civil Engineering  
University of Moratuwa



## ■ GRADUATION REQUIREMENT

---

Minimum of 60 total credits required to obtain the **MSc Degree**, 45 credits from the core modules (including a dissertation listed under core modules) and 15 minimum credits from the elective and optional modules.

Without a dissertation, **PG Diploma** can be obtained by completing a minimum of 40 total credits, 28 credits from the core modules and a minimum of 6 credits from the elective modules. A research project needs to be completed as listed under core modules instead of a dissertation.

## ■ 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+ or above.

## ■ CONTACT INFORMATION

---

For more information, contact the course coordinator on [loshakap@uom.lk](mailto:loshakap@uom.lk) or on extension 2219.

## ■ TRANSPORTATION ENGINEERING DIVISION ACADEMIC STAFF

---

Professor J.M.S.J. Bandara

*B.Sc.(Eng) , Ph.D. (Calgary), FCILT, CEng., MIE (SL)*

Professor W.K.Mampearachchi

*B.Sc.(Eng) , MSCE (S.Florida), Ph.D.(Florida), CMILT, CEng, MIE (SL)*

Dr. H.R. Pasindu

*B.Sc. Eng (Hons), Ph.D.(NUS), CMILT, CEng, MIE (SL)*

Dr. G.L.D.I.De Silva

*B.Sc (Eng), Ph.D (Calgary), P.Eng (Alberta)*

Dr.H.L.K Perera(Course Coordinator)

*B.Sc. Eng (Hons), M.Sc. (K-State,USA),Ph.D.(Uni Melb), A. Dip. in MA (CIMA-UK), CEng., MIE(SL), CMILT, EIT (USA)*