Department of Civil Engineering
University of Moratuwa

MSc. / Masters/ PG Dip. in TRANSPORTATION SYSTEMS 2023/2024

The transportation industry is currently undergoing an unprecedented expansion fuelled by worldwide economic growth. There is an expanding need for highly skilled transportation systems professionals. The programme in Transportation Systems 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 transportation systems, 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.

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.

Transportation Engineering Division, Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka,
Tel: +94112640170, Ext: 2130, Email: pg-ted@uom.lk, Web: https://uom.lk/civil/divisions/transportation/pg-course

MSc. / Masters/ PG Dip. in Transportation Systems 2023

Department of Civil Engineering
University of Moratuwa

TITLE OF AWARD

Master of Science in Transportation Systems
Master of Transportation Systems
Postgraduate Diploma in Transportation Systems

ELIGIBILITY REQUIREMENTS

a). B.Sc. Engineering Honors degree from the University of Moratuwa, or any other equivalent degree in Engineering from a recognized University as judged by the faculty and approved by the Senate.
or
b). Any other four-year degree from a recognized University with at least one-year post qualifying experience in relevant field judged by the faculty and approved by the Senate.
or
c). A general degree from a recognized University with two-years post qualifying experience in a relevant field as judged by the faculty and approved by the Senate.
or
d). Any recognized category of membership of a recognized professional institute obtained through an academic route and with a minimum of two-years post qualifying experience in a relevant field as judged by the faculty and approved by the Senate.

DURATION OF COURSE

2 years (Part Time)

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

COURSE FEES

MSc.	-	RS. 350,000.00
Master	-	RS. 300,000.00
PG Dip.	-	RS. 225,000.00

(Sri Lankan citizens only)
Foreign students please contact course coordinator

Rs. 1500/= Registration fees
Rs. 4500/= Library deposit (Rs. 2000/= non refundable)
(Rs. 2500/= per book - refundable) and
Rs. 500/= Exam Fees payable at registration

TENTATIVE START DATE

First week of December 2023

APPLICATION

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

Application closing date:
14th August, 2023

Completed application forms should be sent to:
pg-ted@uom.lk

For more information, contact the course coordinator on loshakap@uom.lk or on extension 2219.

Transportation Engineering Division, Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka,
Tel: +94112640170, Ext: 2130, Email: pg-ted@uom.lk, Web: https://uom.lk/civil/divisions/transportation/pg-course

MSc. / Masters/ PG Dip. in Transportation Systems 2023

Department of Civil Engineering
University of Moratuwa

PROGRAMME STRUCTURE

Course Unit or Module Code	Course Unit or Module Name or Other	Module Outline	Credit Value	Status (Compulsory / Optional)
CE 5602	Systems and Operational Research Methods in Transport	Systems methods, Optimization techniques, Non-linear models, Methods of calculus, Linear models, Linear programming, transportation problem ,Bellman's approach, additive & multiplicative models, Capacity constrained networks, Minimum spanning tree, Minimum path problem ,Decision under uncertainty & risk, Decision tree, Multi-criteria decision analysis, Game theory, Queuing models and reliability models	3	Core A
CE 6612	Transport Demand Analysis	Transport systems Modelling, Decision making Process, Traditional 4-Step Modelling, Activity Based Modelling, Aggregate Traffic Assignment, Transport data, SP vs RP Surveys, Logit Choice model Form, Logit choice model estimation, Choice model aggregation, Microsimulation fundamentals, Microsimulation Mechanics	3	Core A
CE 6613	Public Transport Systems	Network and operational strategies, Field data collection, Route Planning Scheduling & time tables, Transit fares & fare collection systems, Terminal Planning, Transit Stops locations and Spacing, Transit systems & technology, Public transport information systems, Performance indicators & monitoring, Project and presentations	3	Core A
CE 5619	Research Methods	Introduction to research methods, process, and types of research , Literature review and referencing, Methods of data collection, Questionnaire preparation, Data analysis, reliability and validity of data & interpretation of results, Development of a research proposal, Academic writing for reports & making presentation, Report formatting	1	Core A
CE 5601	Quantitative Methods for Transport Analysis	Data types and data collection, Descriptive Statistics, Probability theory, Random variables and Expected values, Discrete probability distributions, Continuous probability distributions, Sampling techniques, Sampling distributions, Hypothesis testing, Regression models & Trend analysis, Use of spreadsheet software other statistical software for advance statistical analysis	3	Core B
CE 5607	Transport Project Planning and Appraisal	Attributes of transport policy, Best practices in transport sector policy development, Transport policy of Sri Lanka, Sustainable development goals relevant to transport infrastructure development, Sustainability in transportation, Incorporating socio-environmental factors in transport project planning and appraisal, Objectives of planning: inputs into policies, strategies, short/medium/long term planning, urban /regional/national plans, development plans, The planning process: stages (problem, data, analysis, forecasting, generation of alternatives, evaluation, programming, Process of project appraisal: appraisal path, methodology, procedures and documentation, Project implementation, Monitoring and evaluation of projects, Economic analysis, Risk assessment in transport project feasibility, Multi-criteria analysis techniques, Issues in project budgeting and forecasting	3	Core B
CE 6611	Urban & Regional Transport Planning	Transport systems, Transit systems and technologies, Land use and transport, Theories on Land use with an emphasis on Transportation, Transport Planning in Regional Centres, Urban Centres and Local Areas, Transport Service Management, Urban & Regional Planning Process, TIA/EIA,.Techniques and Tools (Land use and Transportation), Transport System Model Selection, Practical Spatial Economic Modelling Using PECAS, Technologies in Urban Transit Systems Planning and Operations, Planning of Transport Intermodal Systems	3	Core B
CE 6614	Transport Economics	Basic economic concepts - resources, wants, scarcity and choice, actors in an economic system, Fundamental problems of an economy and economic systems , Resource allocation – production possibility frontier, Branches of economics – micro and macro economics, Economics of transportation – application of economic concepts in transport (micro), role of transportation in an economy (macro), Demand and supply curve, Derived demand, Determinants of supply, Elasticity of demand and supply, Market equilibrium, Consumer behaviour and demand for transport, Utility theory, Transport production, Cost of transport production, Transport Markets, Revenue and profits, Pricing in Transport, Externalities, Concepts of economic valuation of benefits and costs, travel time saving benefits, vehicle operating cost, accident cost, emission cost, wider economic benefits, Net present value, Benefit cost analysis, EIRR, Project appraisal techniques, Optimization in economic analysis, Risk analysis	3	Core B
CE 5603	Road Safety, Social & Environmental Evaluations	EIA process in Sri Lanka & environment issues related to transport projects , EIA methods & introduction of case study, EIA methods & evaluation, Air & water pollution, Noise, Vibrations, Ecological impacts, Social impacts due to transport projects, Regulatory framework to incorporate social impacts assessment in transport project appraisal, Case studies in social impact assessments, Overview of road safety in Sri Lanka, Key issues in road safety in the global context, Vulnerable road user safety, Accident data collection and analysis, Conflict studies, Road safety performance analysis tools, Road safety audit, Road safety management	3	Core C
CE 6631	GIS and Geomatics in Transport Planning	General overview: what is GIS, spatial data, non-spatial data, geoprocessing, topology, coordinate systems, modelling in GIS, Site suitability analysis using simple spatial data analysis techniques and through models. (The examples will be selected related to the transport engineering), Overview of geocoding and network analysis, sample exercises related to transport engineering with geocoding and network analysis techniques, General overview of EIA, applicability of GIS for the different stages of EIA process, hands-on experience of performing an EIA related to transport engineering with the help of GIS, General overview: Open-Source GIS, Citizen Science, Open Data, General overview of network centrality, tools for network centrality analysis, application related to transport engineering with the help of GIS, General overview of land use analysis techniques, open-source GIS applications for land use analysis and modelling, General overview of Location-based Services (LBS), LBS applications related to transport engineering	3	Elective A
CE 6632	Railway & Airport Infrastructure	Elements of rail infrastructure and operations, Tracks & amp; yards, Stations and related facilities, Scheduling and signalling communication, Security and passenger services, Railway freight operation, Alternate and advanced rail systems – LRT/MRT/Monorail, Concepts of railway design, Railway design methodology, Airport master plan development, Passenger demand forecasting, Terminal operations, Terminal level of service analysis: curb side, check-in, gates etc., Ground access at airports, Airside layout planning: runway, taxiway, apron, Runway geometric design Runway capacity analysis.	3	Elective A
CE 6633	Freight Transport & Logistics	Basic logistics management, Supply chain concept & SCM tools, Networks & Hubs, Collection-distribution systems, Vehicle routing, ITS for distribution, Inventory control, Warehousing, Location theory, Road, Rail ,Air, Sea, Marketing of transport services	3	Elective A
CE 6635	Sustainable Transport Systems	Sustainable goals & targets, unsustainable impacts of transport systems , Sustainable energy solutions biofuels, hydrogen and fuel cells, hybrid and electric vehicles, Sustainable Transportation & City Planning, Public transport, Walking, and Cycling, Emission testing, congestion charges, TOD developments, Carpooling, Park & ride, Gender equity etc.	3	Elective A
CE 6636	Monitoring & Evaluation of Transport Projects & Programs	Role of M&E, Steps in M&E process, Global Trends, Utilization of M&E, Results orientation in programming cycle, Results Frameworks & their , Construction, Building up a M&E System, Selecting outcomes and Performance Indicators, Baseline values of indicators, Monitoring for Results and Quality Assurance, Evaluation Designing – stages / processes, Evaluation Methods and their use, Current Approaches, Methods and Design in M&E, Data source, data collection method, cost of collection, data analysis and reporting, Basic Principles and Guidelines of M&E (ethics, standards, norms, values, etc.), Contextual Conformities; Culture, Norms, Compliance to National / International Standards & Norms, Commissioning M&E Processes; Facilitation, Information Collection, etc., Resource Allocation in M&E; Managing a M&E unit / team, Advocacy, Communication and Promotion of Utilization of M&E Outcomes	3	Elective A
CE 5605	Traffic Management & Intelligent Transport Systems	Need for Traffic Management, Traffic Demand Management, Road Signs and Markings, Traffic Calming & Speed control, managing non-motorized transport, TIA regulations, steps involved in TIA, Parking management systems, Pedestrian Facilities, Walskbility measures, bicycle facilities, ITS systems & technology, Advanced user information systems, Advanced driver assistance systems (ADAS), Introduction to autonomous vehicle technology, Introduction to automated vehicle technology, v2v/v2x communication, Real time traffic monitoring and adaptive traffic signals, Use of crowdsource data & vehicle priority systems, Microscopic traffic modelling & demand estimation, Transport data bases, Tolling systems/ congestion pricing.	3	Elective B
CE 5606	Highway Planning & Management **	Elements of highway planning and feasibility studies, Functions of a road (Mobility, Accessibility, Safety) and its design considerations, Access management of highways, Concepts of highway capacity analysis, Highway capacity analysis methodologies, Planning and preliminary engineering applications of highway capacity analysis methods, Concepts of asset management, pavement management systems, asset management tools, Highway financing mechanisms, Case studies in PPP projects	3	Elective B

**Only for students with Engineering or Science Degrees

Transportation Engineering Division, Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka,
Tel: +94112640170, Ext: 2130, Email: pg-ted@uom.lk, Web: https://uom.lk/civil/divisions/transportation/pg-course

MSc. / Masters/ PG Dip. in Transportation Systems 2023

Department of Civil Engineering
University of Moratuwa

■ GRADUATION REQUIREMENT

1. MSc in Transportation Systems
Students are required to complete 25 credits from core (A,B,C) modules, 15 credits from electives (A,B) and 20 credit MSc Dissertation.

2. Master of Transportation Systems
Students are required to complete all core A modules (10 credits), minimum 6 credits from core B modules, minimum 6 credits from elective A and a Research Project (independent study) worth 5 credits.

3. PG Diploma in Transportation Systems
Students are required to complete all core A modules (10 credits), minimum 6 credits from core B modules and minimum 6 credits from elective A.

■ CONTACT INFORMATION

For more information, contact the course coordinator on 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)

Professor 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)