



Unit Information Form (UIF)

(The UIF provides the definitive record of the designated Unit)

SECTION A

General Unit Information

Unit Name	Transportation and Highway Engineering
Unit Code	STI023-3
Level	6 FHEQ
Credit Value	15
Location(s) of Delivery	Off-site STI Myanmar University (Yangon and Mandalay)
Period(s) of delivery	15 weeks (Semester 2)
Pre-requisites or Restrictions	
Aims and Relevance	<p>This Unit aims to provide an introduction to current thinking on the challenges of transportation and highway engineering, including the rapidly changing nature of public and private transportation systems. It outlines the main modes of transport which exist within modern transport networks and the interactions that occur when considering the planning, design and operations of highways. The Unit covers the concept of transportation in terms of passenger movement, freight haulage and communications and identifies the factors maximizing efficiency, convenience and safety for travellers; typical highway cross-sections showing pavement details; specifies the processes used for the construction and recycling of typical road pavements and their foundations; assesses the highway loading in terms of axles and sub-grade strength; use of the design manual for roads and bridge methods. Learners will also analyse the design concepts and refine the design options to develop final detailed design and subsequent construction of a transportation project taking environmental factors into account, as well as risk assessment for road safety.</p>
Syllabus Content	<ul style="list-style-type: none"> • Introduction to transportation engineering <ul style="list-style-type: none"> ○ The Transportation Planning Process ○ Forecasting Future Traffic Flows ○ Economic appraisal of highway schemes ○ Public transportation systems ○ Smart City Transportation ○ Transportation sector developments and regulations in Myanmar • Highway Engineering <ul style="list-style-type: none"> ○ Highway Traffic Analysis ○ The 'level of service' approach using current Transportation Research Board reports (USA)

	<ul style="list-style-type: none"> ○ Design of Highway intersections ○ Geometric Alignment and Design ○ Highway pavement materials ○ Highway pavement design, materials and loading ○ Characteristics of vehicle and road ○ Pavement construction methods a detailing ○ Pavement Maintenance ○ Highway Safety and Accident Study ○ Highway Development Process and Sustainability in Transportation Engineering ○ Sustainable Parking Studies ○ Capacity, Operation Design and Operation Costs ○ Risk Assessment for Highway Safety ● Railway Engineering <ul style="list-style-type: none"> ○ Rails, Sleepers ○ Curves, Super elevation, Points and crossing ○ Railway Safety ○ Railway and The Natural Environment ○ Light rail transit systems
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Learning outcomes

On completion of this unit you should be able to:

1. Demonstrate the following knowledge and understanding
 - Analyse highway requirements and issues for various vehicles and evaluate types of highway infrastructure.
2. Demonstrate the following skills and abilities
 - Evaluate different designs for highway infrastructure and management, including considerations of sustainability, safety and risk.

PSRB outcomes

Indicate any specific Professional, Statutory or Regulatory Body (PSRB) requirements met by this unit.

UK Standard for Professional Engineering Competence (UK-SPEC): AHEP3 IEng Learning Outcomes:

EA1i, EA2i, EA3i, EA4i, D4i, EL3i, EL5i,

Joint Board of Moderators (JBM) Core Threads - Primary Outcomes (assessed and evidenced):

Design, Sustainability, Health and Safety Risk Management,

Summary learning hours

	Scheduled	Guided	Independent	Autonomous	Placement	Total
Hours	50	25	65	10	-	150
Percentage	33.33%	16.67%	43.33%	6.67%	0%	100%

Approach to learning

This unit's approach is from the standpoint of design whilst complying with recommendations of regulatory bodies, but also considers the future development and takes those into account. The students will examine the requirements and quantify these within the context of developing country like Myanmar and consider the local conditions such as heavy rainfall seasons.

Learner development

This Unit particularly focuses on the development of your abilities in the following areas:

Enquiry	You will analyse the fundamental design concepts and methods used in highway engineering and railway engineering.
Contextual understanding	You will identify how the design is to be undertaken and reorganise the design options to develop final detail designs and subsequent construction of transportation projects taking environmental factor, risk assessment for road safety and construction methods and how to implement these in the workplace to be successful. You will also examine planning, design and operation cost of highways and railways engineering, sustainable highway practice and the recycling of road pavements materials.
Collaboration	You will work in groups to review and monitor safety requirements, to arrive at possible solutions to the case study. You will work together with other students and to compile a group report for a case study.
Enterprise	You will present your project and analysis finding, sustainable highway practice, summarise in a professional manner to evaluate and achieve.

Assessment summary

No	Assessment Method Code ¹	Learning outcome(s)	Weight %	Submission week	Length (of exam)	Exemption from Simplified Marking Scheme approved ²
1	CW-Port	1&2	50	14	-	
2	Ex	1&2	50	15	2 Hrs.	

¹ See the UIF Guide for permissible codes

² Exemptions can only be granted by TQSC. The types of assessment task that can request an exemption are detailed in Chapter 8 of the Quality Handbook

Assessment details

Assessment 1. A developmental portfolio that looks at the theory and principles of transportation and highway design by selecting appropriate solutions for the flow of traffic, vehicle type and density, level of service for lane and pedestrian requirements for given case studies. Record progress in design of highways or railways, pavements, intersections, drainage as well as analyse that the traffic volume, density, horizontal and vertical curves.

Assessment 2. An invigilated exam which looks at evaluation of transportation and highway engineering for design of horizontal and vertical curves, super-elevation, intersections, road safety, highway drainage with safety issues.

Threshold expectations

In order to pass Assessment 1 you will need to:

- Analyse the theoretical and empirical aspects of transportation engineering in terms of passenger movement, freight haulage and communication and identifying the factors maximizing efficiency comfort, convenience and safety for travellers and make recommendations for improvement. (contributing to EA1i)
- Demonstrate the ability to apply quantitative methods in order to understand the performance of traffic conditions, density, horizontal and vertical curves. (contributing to EA2i)
- Use the results of analysis on the theory and principles of transportation and design of pavements in order to solve engineering problems and to recommend solutions for the highway traffic analysis, level of service for public transport, traffic lane and pedestrian requirements (contributing to EA3i)
- Apply problem-solving skills, technical knowledge and understanding to create or adapt design solutions for pavements, intersections and drainage systems. (contributing to D4i)

In order to pass Assessment 2 you will need to:

- Evaluate the transportation modes and the creation of effective interchange between transportation systems, demonstrating the ability to apply quantitative methods in order to understand the performance of the systems and components. (contributing to EA2i)
- Apply an integrated approach to engineering problems and relevant technologies by illustrating a typical highway cross section showing the processes used for construction of pavements and road drainage systems. (contributing to EA4i)
- Demonstrate the ability to use the results of engineering analysis to solve engineering problems within highway and transportation engineering and to recommend appropriate action. (contributing to EL3i)
- Identify relevant legal requirements governing transportation and highway engineering activities, including health and safety, product safety and liability issues. (contributing to EL5i)
- Evaluate transportation, highway and parking engineering theory with regard to issues of health, safety, environmental and commercial risk. (contributing to EL6i)

SECTION B

Recommended Reading

Core text – this unit is supported by the following core text:

- Rogers, M. and Enright, B., (2016). *Highway Engineering 3rd Edition*. Oxford, United Kingdom: Wiley-Blackwell Publishing Ltd., ISBN:1405163585

Guided reading – the following is expected reading for this unit. Details of what to read and when will be provide in the BREO site.

- Black, A., (1996). *Urban Mass Transportation Planning*. New York, NY: McGraw-Hill International Editions .ISBN: 0071139508
- Braham, A. (2017). *Fundamentals of Sustainability in Civil Engineering*. 1st ed. Boca Raton, FL: CRC Press.
- Griffiths, O.V. (2011). *Managing Health and Safety in Construction: (Design and Management) Regulations 2007*. 2nd ed. New York, NY. Taylor& Francis, ISBN: 071766223.
- MacKay W. (1997). *Transport in the Urban Environment*. Dunfermline, United Kingdom: Institution of Highways and Transportation publishing, ISBN: 0902933213
- Sussman J, (2000). *Introduction to Transportation Systems*. Norwood, MA: Artech House Inc. ISBN: 1-58053-141-5
- Transportation Research Board (2019). *Critical Issues in Transportation 2019*. Washington, DC: National Academies Press.

Independent study – to receive high grades you will need to demonstrate your wider reading. The following resources provide useful background reading for the material in this unit. This is not an exhaustive list and students should read widely from the variety of journals available in the Learning Resources Centre

- Gassmann, O., Böhm, J., & Palmié, M. (2019). *Smart Cities: Introducing Digital Innovation to Cities*. Bingley, UK: Emerald.
- National Cooperative Highway Research Program. (2018). *Resilience in Transportation Planning, Engineering, Management, Policy and Administration*. NCHRP Synthesis 527. Washington, DC: TRB.
- National Cooperative Highway Research Program. (2018). *Systematic Pedestrian Safety Analysis*. NCHRP Research Report 893. Washington, DC: TRB.
- Perry, P. (2016). *Health and Safety: Questions and Answers. A practical approach*. 2nd ed. London: ICE.
- Perry, P. (2016). *Risk Assessments: Questions and Answers. A practical approach*. 2nd ed. London: ICE.
- Smith, J.S. (2017). *Reliability, Maintainability and Risk Eighth Edition: Practical Methods for Engineers*. 9th ed. Oxford: Butterworth-Heinemann

- Transit Cooperative Research Program (2012). *Track Design Handbook for Light Rail Transit. Report 155*. 2nd ed. Washington DC: Parsons Brinckerhoff Inc.
- Twidell, J. and Weir, T. (2005) *Renewable Energy Resources*. 2nd ed. London: Routledge.

Myanmar Transport Sector Policy Notes: Summaries for Decision Makers published by Asian Development Bank : <https://www.adb.org/publications/myanmar-transport-sector-policy-note-summary-decision-makers>

Regulatory and development documents from Ministry of Transport (Myanmar)

Once the unit has been approved this list can be replaced with a link to the online reading list.

Once initial approval of the unit has been given, the Unit Co-ordinator may propose changes to this section to the Academic Liaison Librarian

Equality Impact Assessment

Question	Y/N/NA	Additional anticipatory adjustments/actions if necessary
Learning materials will be made available in advance of sessions for students to adapt as appropriate?	Y	
The approach to teaching and learning is sufficiently flexible to enable all students to succeed?	Y	
The approach to group work takes account of the needs of students with disabilities and from diverse backgrounds?	Y	
The approach to practical work takes account of the needs of students with disabilities?	Y	
Students with a protected characteristic ³ have an equal opportunity to achieve the learning outcomes?	Y	
The assessment tasks provide all students with an equal opportunity to succeed?	Y	
Any other aspects of the unit that might pose potential challenges from an equality or diversity perspective have been considered?	NA	

³ Age, Gender reassignment, Marriage and civil partnership, Pregnancy and maternity, Race, Religion and belief, Sex, Sexual orientation

SECTION C

Administrative Information – Faculty completion	
Faculty	Engineering
Portfolio	
School/Department	STI Myanmar University/ Department of Civil Engineering
Unit Co-ordinator	U Myo Min Hlaing
Version Number	
Approved by	
Date of approval (dd/mm/yyyy)	

Shared Units – Indicate below all courses which include this Unit in their diet

	Name	Date
Form completed by	U Myo Min Hlaing	
Signature of Chair of Faculty TQSC to confirm the accuracy of information presented		

Unit Updates – ensure that the revised UIF is given a new version number each time a change is made		
Date	Nature of Update	FTQSC Minute Ref:

Administrative Information – Academic Registry completion	
JACS / HECoS code (KIS)	