

ENGR H4503: Highway & Traffic Eng 1

Module Title	:		Highway & Traffic Engineering I		
Language of	f Instruction	n:	English		
Credits		10			
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NFQ Level:		8			
Module Deli	vered In		2 programme(s)		
Teaching & Strategies:	Learning		Lectures; Laboratory Practice/Field Work; Project Work; Private Study		
Module Aim	:		The aims of this module are to provide the students with a knowledge of (a) analysis of traffic flow and preparation of traffic analysis reports; (b) geometric layout design of roads and junctions; (c) the materials used in bituminous pavements, relevant laboratory tests associated with these materials and the design of bituminous pavements.		
Learning Ou	itcomes				
On successf	ul completio	n of th	nis module the learner should be able to:		
LO1	Evaluate a appropriate	ind an e num	alyse traffic flow and relate this to road/junction capacity and prepare a traffic analysis report. Select the ober of lanes, lane widths and junction geometry for roads based on traffic flows.		
LO2	Prepare a	geom	etric design of a section of road and junction using 3D road design software.		
LO3	Select app	oropria	ate bituminous pavement structures for vehicle loading and specify appropriate testing for these materials.		
LO4	Demonstra preparing o	ate ap drawii	propriate presenting, written and visual communication skills including writing reports, presentations and ngs using 3D road design software.		
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Pre-requisite	e learning				
<i>Module Recommendations</i> This is prior learning (or a practical skill) that is recommended before enrolment in this module.					
No recommendations listed					
Incompatible Modules These are modules which have learning outcomes that are too similar to the learning outcomes of this module.					
No incompati	ible modules	s liste	d		
Co-requisite Modules					
No Co-requis	site modules	listed			
Requiremen This is prior I	ts earning (or a	a prac	tical skill) that is mandatory before enrolment in this module is allowed.		

Bachelor of Engineering (Ordinary) in Civil Engineering



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Module Content & Assessment

Indicative Content

Traffic Engineering Studies

(a) Travel Time and Delay Studies (b) Parking studies (c) Accident studies (d) Expansion of traffic counts into AADT flow (e) Scoping design and reporting on a Traffic Engineering Study

Basic Elements of Highway Traffic Analysis

(a) Flow-density relationships (b) Speed density relationships (c) Speed flow relationships (d) Highway capacity and level of service (e) Design methods used to establish maximum service flow rates for 2- lane and multi- lane highways (f) Derivation of design reference flows (g) Geometric layout for major / minor intersections (h) Equations used for determining capacities and delays at junctions (i) Traffic capacity at roundabouts

Geometric Design for Highways (a) Geometric details of Roundabouts (b) Sign posting and road marking (c) Geometric parameters on design speed (d) Horizontal allignment (e) Vertical allignment (f) Geometric design project for a highway (g) Relevant excerpts from Transport Infrastrucure Ireland DMRB

Civil 3D

(a) Horizontal Alignment (b) Vertical Alignment (c) Assemblies (d) Corridors (e) Sample Lines (f) Cut and Fill Volume Calculations

Soil Engineering for Highway Design

(a) Soil characteristics (b) Basic engineering properties of soil (c) Classification of soils for highway construction (d) Soil compaction (e) Sub- base and road- base materials

Bituminous Materials in Pavement Design

(a) Binder Types (b) Manufacture, storage and handling of bitumen (c) Constitution, structure and mechanical testing of bitumen (d) Bitumen emulsions and modified bitumen (e) Aggregate specifications (f) Composition and specification of bituminous paving material (g) Blended aggregates and mix design (h) Transport, laying and compaction

Design of Flexible Pavements

(a) Structural Components (b) General principles (c) Foundation design (d) Pavement design using LL 1132 (Powell et al. 1984) (e) Pavement design using DMRB HD 25-26 charts (f) Traffic loading

Assessment Breakdown	%
Continuous Assessment	10.00%
Project	30.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	End of Term Assessment	1,2,3	10.00	n/a

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Project Literature Review, Presentations etc	3,4	10.00	Sem 1 End
Project	Traffic Study	1,4	10.00	n/a
Project	Geometric Road Design	2,4	10.00	n/a

No Practical

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Exam	1,2,3	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment



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Module Workload

Workload: Full Time				
Workload Type	Frequency	Average Weekly Learner Workload		
Lecture	30 Weeks per Stage	2.00		
Laboratory	30 Weeks per Stage	1.00		
Estimated Learner Hours	30 Weeks per Stage	4.17		
	Total Hours	215.00		

Module Delivered In			
Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering - Ab Initio	5	Mandatory
CW_CMCEN_B	Bachelor of Engineering (Honours) in Civil Engineering - Add On	1	Mandatory