ENGR H4503: Highway & Traffic Eng 1

Module Title:	Highway & Traffic Engineering I
Language of Instruction:	English

Credits:	10

NFQ Level:	8

Module Delivered In	2 programme(s)

Teaching & Learning Strategies:	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 Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Evaluate and analyse traffic flow and relate this to road/junction capacity and prepare a traffic analysis report. Select the appropriate number of lanes, lane widths and junction geometry for roads based on traffic flows.
LO2	Prepare a geometric design of a section of road and junction using 3D road design software.
LO3	Select appropriate bituminous pavement structures for vehicle loading and specify appropriate testing for these materials.
LO4	Demonstrate appropriate presenting, written and visual communication skills including writing reports, presentations and preparing drawings using 3D road design software.

Pre-requisite learning
Module Recommendations *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 incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical 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