

REM master basic syllabus

Title:

CE3007 Hydraulics

Credit value:

5 ECTS

Mandatory/Optional:

Optional

Semester:

1

Lecturer/s:

Ken Bruton, Gregorio Iglesias

University:

University College Cork

Department:

School of Engineering

Rationale:

This module aims to introduce students to hydraulic modelling, hydraulic machinery, pipe systems and other engineering aspects of fluid mechanics.

Objectives:

On successful completion of this module, students should be able to:

- Calculate pipeline systems*
- Derive the performance characteristics of hydraulic pumps and hydraulic turbines*
- Understand open-channel flow*
- Apply dimensional analysis*
- Understand the theory of hydraulic modelling and its applications in engineering*

Skills: *(according to the list of skills provided)*

Subject skills	REM Master Skills						
	L2.1	L2.2	L2.3	L2.4	L2.5	L2.6	L2.7
L3.1. Calculate pipeline systems	X		X	X	X	X	X
L3.2. Assess performance of hydraulic pumps & turbines	X	X	X	X		X	X
L3.3. Understand open channel flow				X		X	X
L3.4. Design and apply hydraulic models	X	X	X	X	X		X

Teaching and learning methods:

The teaching method is based on a series of lectures where the lecturer explains the main concepts through power point presentations and worked out examples on the board. The students are also presented with a variety of issues of practical nature during the lectures. The module also a laboratory practical in the Fluid Mechanics laboratory of the School of Engineering.

Allocation of student time:

	Attendance (classroom, lab,...)	Non attendance (lecture preparation, self study...)
Lectures	24 hours	10 hours
Laboratory practical	3 hours	3 hours
Private study		41 hours

Assessment:

The report of the laboratory practical and the final written exam test students' achievements of the learning outcomes.

Assessment Matrix:

Subject skills	Assessment method					
	Exam	Class test	Coursework	Report
All	85%	-	-	15%		

Programme:

Lesson 1	<i>Introduction to hydraulics and hydrodynamics 3h</i>
Lesson 2	<i>Pipelines 3h</i>
Lesson 3	<i>Hydraulic pumps 3h</i>
Lesson 4	<i>Hydraulic turbines 3h</i>
Lesson 5	<i>Open-channel flow (I) 3h</i>
Lesson 6	<i>Open-channel flow (II) 3h</i>
Lesson 7	<i>Open-channel flow (III) 3h</i>
Lesson 8	<i>Dimensional analysis & hydraulic models 3h</i>

Resources:

A classroom, equipped with a blackboard and audio-visual resources (laptop/computer and Internet connection + projector), for the lectures.

Fluid Mechanics laboratory, School of Engineering.

Bibliography:

Chadwick, Morfe and Borthwick, 2004, Hydraulics in Civil and Environmental Engineering, SPON.

Daugherty, Franzini, 1989, Fluid Mechanics with Engineering Applications, Mc Graw Hill.

Hamill, 2001, Understanding Hydraulics.

Roberson, Cassidy, Chaudhry, 1998, Hydraulic Engineering, Wiley.

Ven Te Chow, 1990. Open Channel Flow; Mc Graw Hill.

Further comments: