CA3677: HYDRAULICS AND HYDROLOGY

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Hydraulics and Hydrology

Subject Code
CA - Civil and Architectural Engineering
Course Number
3677

Academic Unit
Architecture and Civil Engineering (CA)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
CA2675 Fluid Mechanics

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

Equivalent Courses
BC3677 Hydraulics and Hydrology

Exclusive Courses
Nil

Part II Course Details

Abstract

To teach the student the theories and detailed calculations of fluid machinery, open channel flows and engineering hydrology.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe and identify the appropriate application of fluid principles to hydraulic machineries and pipe systems	25	x	x	
2	Describe and identify the appropriate formulas for evaluating the principles of open channel flows and solve various open channel problems	25		x	
3	Discover the importance of engineering hydrology	25	x	x	
4	Understand and identify the appropriate formulas for carrying out mass curves and rainfall analysis and hydrological design	25			x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Students will engage in lectures to gain the knowledge about the theories, concepts and problem solving skills	1, 2, 3, 4	
2	Tutorials	Students will engage in tutorials to extend their use of knowledge during discussions on tutorial questions	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test	1, 2, 3, 4	20	
2	Lab reports	1, 2, 3, 4	10	
3	Assignments	1, 2, 3, 4	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%.

Assessment Rubrics (AR)

Assessment Task

Test

Criterion

1.1 CAPACITY for SELF-DIRECTED LEARNING to understand the principles of hydraulics and hydrology

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal level

Assessment Task

Lab report

Criterion

2.1 ABILITY to USE/APPLY the methodology and procedure with ACCURACY in using the experimental techniques

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Assignment

Criterion
3.1 CAPACITY for SELF-DIRECTED LEARNING to understand the principles of hydraulics and hydrology

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Examination

Criterion
4.1 ABILITY to UNDERSTAND the taught methodology and procedures in using the modelling and calculation techniques
4.2 ABILITY to APPLY the scientific techniques in solving theoretical and application problems

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Hydraulic machinery, open channel flow, Manning's equation, critical flow, hydraulic jump, engineering hydrology, mass curves and rainfall analysis and hydrological design.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Yunus A. Cengel and John M. Cimbala, Fluid Mechanics Fundamentals and Applications, 2nd edition, McGraw Hill Higher Education, New York, 2010. ISBN: 978-007-128421-9.
2	Terry W. Sturm, Open Channel Flow, 2nd edition, McGraw Hill Higher Education, New York, 2010. ISBN: 978-007-126793-9
3	John E Gribbin, Introduction to Hydraulics and Hydrology: With Applications for Stormwater Management, ISBN-13: 9780766827943.
4	Gupta, Ram S., Hydrology and Hydraulic Systems, Prospect Heights, Waveland press, 2nd Edition.
5	Warren Viessman, Jr. and Gary L. Lewis, Introduction to Hydrology, Upper Saddle River, NJ, Prentice Hall, 5th Edition.