

The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] Hydrosystems Engineering

[Course Code] CIVL 3510

[No. of Credits] 3 Credits

[Any pre-/co-requisites] Pre-requisite: CIVL 2510

Instructor

Name: LU, Mengqian

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Office Hours: By email appointment

Course Description

This course introduces the fundamental knowledge essential to the design and analysis of hydrosystems engineering problems with consideration of climate change. The course consists of two interrelated parts: hydrology and hydraulics, within the non-negligible scope of climatology. Hydrology covers various processes of the water cycle (including precipitation, infiltration, rainfall-runoff modeling, and flow routing) that produce loads on hydrosystems. Hydraulics, on the other hand, uses basic principles of fluid mechanics in the analysis of natural water systems and the design of engineering structures.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Demonstrate comprehensive factual knowledge of the climate characteristics, hydrological features, and hydrosystems engineering specific to Hong Kong's geographical and environmental context.
2. Clearly explain and articulate the fundamental principles and key concepts in climate science, atmospheric processes, hydrology, and hydraulics, with an emphasis on their interconnections and relevance to real-world scenarios.
3. Effectively evaluate and apply theoretical and practical knowledge from climate science and hydrological engineering to analyze and solve complex hydrosystems engineering challenges, particularly those influenced by climate variability and change.
4. Demonstrate critical thinking and innovative approaches in the analysis, planning, and decision-making processes related to the management and engineering of hydrosystems in Hong Kong.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Homework	10%	Weekly
Mid-Term 1	20%	Week 7
Mid-Term 2	20%	Week 12
Final Examination	50%	Week 15/16

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

[add to/delete table as appropriate]

Assessed Task	Mapped ILOs	Explanation
Homework	ILO2, ILO3, ILO4	The homework is designed to train the students to apply relevant concepts (ILO2) to solve real-world problems in hydrosystems engineering (ILO3, ILO4).
Mid-Term 1	ILO1, ILO2, ILO3	The Mid-Term 1 assesses students' knowledge about Hong Kong's climate and hydrological features (ILO1), engineering, and schemes, and the students' ability to apply concepts of climate and atmospheric sciences and hydrology (ILO2) to solve problems (ILO3).
Mid-Term 2	ILO2, ILO3	The Mid-Term 2 assesses students' ability to apply the concepts of fluid mechanisms (ILO2) to solve real-world problems in hydraulic systems, such as flow routings (ILO3).
Final Examination	ILO1, ILO2, ILO3, ILO4	The Final Examination holistically assesses students' factual and conceptual knowledge, problem-solving skills, and creativity in addressing hydrosystems engineering issues in the context of climate change.

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

Generative artificial intelligence tools are permitted to assist students with understanding the concepts and brainstorming the knowledge learnt. However, the assessments are based on clear calculation steps and students' critical thinking and problem-solving ability.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include [specific details, e.g., strengths, areas for improvement]. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

No resubmission of homework is allowed after the designated due date.

Required Texts and Materials

No specific textbook is required.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

[Optional] Additional Resources

Recommended but not required textbooks:

Marlyn L. Shelton, Hydroclimatology: Perspectives and Applications, Cambridge University Press

Frank M. White, (8th edition), Fluid Mechanics, McGraw-Hill Education

All necessary material will be provided via CANVAS.