City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester A 2021/22

Part I Course Overview

Course Title:	Engineering Thermofluids II
Course Code:	SEE3101
Course Duration:	One semester
Credit Units:	4
Level:	B3
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	SEE2101 Engineering Thermofluids I
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

Building on the basic principles developed in SEE2101 Engineering Thermofluids I, the course aims to educate students on the intermediate level fluid mechanics as well as heat and mass transfer. Focusing on various applications such as pumps, turbines, heat exchangers and distillation, the course will help students in building a strong appreciation for fundamentals thermosciences, as well as its practical and creative nature in complex processes.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Apply the principles of fluid mechanics to analyze problems related to energy and environment applications.	40%		√	
2.	Apply the principles of heat transfer in the designs of heat exchangers and other innovative applications.	30%		√	
3.	Describe the principles of mass transfer and its analogy with heat transfer, and apply in various problems such as distillation columns, as well as other innovative applications.	30%		√	
** If weighting is assigned to CILOs, they should add up to 100%.*		100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	Explain theories and concepts	✓	✓	✓	
Tutorials	Apply theories and concepts on practical examples	✓	✓	✓	
Lab-based experiment	Apply theories and concepts on hands-on experiments	✓	✓	✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting*	Remarks
	1	2	3		
Continuous Assessment: __50__%					
Assignments There will be several assignments throughout the semester. Students will complete the assignments to demonstrate their ability to apply their knowledge in fluid mechanics, heat transfer and mass transfer to analyse problems related to energy and environmental applications.	✓	✓	✓	20%	
Labs Students will perform experiments in three lab sessions on fluid mechanics, heat transfer and mass transfer. Students will also write individual lab reports to analyse and present their results.	✓	✓	✓	15%	
Quiz Students will complete a midterm test to demonstrate their ability to apply their knowledge in thermofluid problems.	✓	✓	✓	15%	
Examination: __50__% (duration: 2 hours , if applicable) Final exam will test students' ability to apply their knowledge learned throughout the course in thermofluid problems.					
** The weightings should add up to 100%.*				100%	

Examination duration: 2 hrs

Percentage of coursework, examination, etc.: 50% by coursework; 50% by exam

To pass a course, a student must do ALL of the following:

1) obtain at least 30% of the total marks allocated towards coursework (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);

2) obtain at least 30% of the total marks allocated towards final examination (if applicable); and

3) meet the criteria listed in the section on Assessment Rubrics.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Ability to analyse and solve problems related to fluid mechanics, heat transfer and mass transfer for energy and environmental applications	Excellent analysis and problem solving skills to demonstrate in-depth understanding of fluid mechanics, heat transfer and mass transfer	Good analysis and problem solving skills to demonstrate good understanding of fluid mechanics, heat transfer and mass transfer	Acceptable analysis and problem solving skills to demonstrate adequate understanding of fluid mechanics, heat transfer and mass transfer	Marginally acceptable analysis and problem solving skills to demonstrate some understanding of fluid mechanics, heat transfer and mass transfer	Poor analysis and problem solving skills and is barely able to demonstrate an understanding of fluid mechanics, heat transfer and mass transfer
2. Labs	Ability to perform experiments and present results in the form of lab reports related to fluid mechanics, heat transfer and mass transfer for energy and environmental applications	Excellent report writing and experimental skills with in-depth understanding of fluid mechanics, heat transfer and mass transfer	Good report writing and experimental skills with good understanding of fluid mechanics, heat transfer and mass transfer	Acceptable report writing and experimental skills with adequate understanding of fluid mechanics, heat transfer and mass transfer	Marginally acceptable report writing and experimental skills with some understanding of fluid mechanics, heat transfer and mass transfer	Poor report writing and experimental skills with poor understanding of fluid mechanics, heat transfer and mass transfer
3. Quiz	Ability to analyse and solve problems related to fluid mechanics, heat transfer and mass transfer for energy and environmental applications	Excellent analysis and problem solving skills to demonstrate in-depth understanding of fluid mechanics, heat transfer and mass transfer	Good analysis and problem solving skills to demonstrate good understanding of fluid mechanics, heat transfer and mass transfer	Acceptable analysis and problem solving skills to demonstrate adequate understanding of fluid mechanics, heat transfer and mass transfer	Marginally acceptable analysis and problem solving skills to demonstrate some understanding of fluid mechanics, heat transfer and mass transfer	Poor analysis and problem solving skills and is barely able to demonstrate an understanding of fluid mechanics, heat transfer and mass transfer
4. Examination	Ability to analyse and solve problems related to fluid mechanics, heat transfer and mass	Excellent analysis and problem solving skills to demonstrate	Good analysis and problem solving skills to demonstrate good	Acceptable analysis and problem solving skills to demonstrate	Marginally acceptable analysis and problem solving skills to demonstrate some	Poor analysis and problem solving skills and is barely able to demonstrate an

	transfer for energy and environmental applications	in-depth understanding of fluid mechanics, heat transfer and mass transfer	understanding of fluid mechanics, heat transfer and mass transfer	adequate understanding of fluid mechanics, heat transfer and mass transfer	understanding of fluid mechanics, heat transfer and mass transfer	understanding of fluid mechanics, heat transfer and mass transfer

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Fluid mechanics; control volume analysis; turbomachines; life and drag forces; boundary layers, open channel flow; heat exchangers; mass transfer fundamentals; diffusion mass transfer, phase equilibrium; distillation columns.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Nil

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Cengel, Y.A., Turner, R.H., Cimbala, J.M., *Fundamentals of Thermal-Fluid Sciences*, 5th ed. McGraw-Hill, 2016.
2.	Bruce Munson, Donald F. Young, Theodore H. Okiishi, *Fundamentals of Fluid Mechanics*, 7th ed., Wiley, 2012.
3.	Incropera, F.P., DeWitt, D.P., Bergman, T.L., Lavine, A.S., *Fundamentals of heat and mass transfer*, John Wiley & Sons, New York, 2011.
4.	Kundu, P. K., Cohen, I. M., Dowling D. R., *Fluid mechanics*, 5th ed. Academic Press, 2012.
5.	Hines, A.L., Maddox, R.N., *Mass Transfer: Fundamentals and Applications*, Prentice Hall, 1985.