City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester A 2022/23

Part I Course Overview

Course Title:	Gas Engineering – Theories and Practices
Course Code:	SEE6120
Course Duration:	One semester
Credit Units:	3
Level:	P6
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)*	Nil
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

This course is mainly related to gas energy value chain/systems engineering, including Exploration and Production, Transportation and Storage, and Utilization. Engineering practices dealing with energy efficiency, energy services, facility and plant management, sustainability and environmental compliance, and alternative energy technologies will be taught in the course. Particular focuses will be given to latest development in Mainland China and Hong Kong.

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.	Discuss key features of gas energy value chain and contribution in energy consumption in worldwide and local markets	10%	√		
2.	Conduct comparative study on energy efficiency and environmental impact of gas energy and other forms of energy	10%	√	√	
3.	Describe commonly available types of gas energy and elaborate engineering practices and utilization solutions	50%	√	√	
4.	Identify technologies to enhance utilization of gas energy	10%	√	√	
5.	Analyze the potential of upcoming gas energy technologies	10%	√		
6.	Formulate practical and sustainable gas energy utilization and engineering solutions for real-life applications	10%	√	√	√
		100%			

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	4	5	6	
Lecture	Explain key concepts, such as gas engineering practices and gas utilization technologies	√	√	√	√	√	√	2.5 hours/week
Tutorial, class demo	Solidify students' concepts with practice	√	√	√	√	√	√	0.5 hour/week

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	4	5	6		
Continuous Assessment: 60 %								
Assignment	√	√	√	√	√	√	30%	
Project		√	√	√		√	30%	
Examination: __40__% (duration: 2 hours , if applicable)								
							100%	

Examination duration: 2 hrs
Percentage of coursework, examination, etc.: 60% by coursework; 40% 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 Grading of Student Achievement.

5. Assessment Rubrics

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

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignment	Ability to analyse and solve questions related to gas engineering	Able to solve problems without any errors	Able to use the correct concepts for problem solving, but have errors in calculation	Can determine the relevant equations and show some attempt to solve a problem in the correct direction	Not able to use the correct concept to solve a problem
2. Project	Ability to analyse and device practical solutions related to gas engineering	Able to correctly analyse and device practice solutions	Able to give reasonable analysis but with errors	Can give reasonable approach to solution but with insufficient analysis	Not able to analyse and device solutions to solve a problem
3. Final exam	Ability to analyse and solve practical problems related to gas engineering	Able to solve problems without any errors	Able to use the correct concepts for problem solving, but have errors in calculation	Can determine the relevant equations and show some attempt to solve a problem in the correct direction	Not able to use the correct concept to solve a problem

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	Ability to analyse and solve questions related to gas engineering	Able to solve problems without any errors	Able to use the correct concepts for problem solving, but have errors in calculation	Can determine the relevant equations and show some attempt to solve a problem in the correct direction	Can describe the underlying concept but not able to solve the problem	Not able to use the correct concept to solve a problem
2. Project	Ability to analyse and device practical solutions related to gas engineering	Able to correctly analyse and device practice solutions	Able to give reasonable analysis but with errors	Can give reasonable approach to solution but with insufficient analysis	Can only give general approach to solve problem with insufficient analysis	Not able to analyse and device solutions to solve a problem
3. Final exam	Ability to analyse and solve practical problems related to gas engineering	Able to solve problems without any errors	Able to use the correct concepts for problem solving, but have errors in calculation	Can determine the relevant equations and show some attempt to solve a problem in the correct direction	Can describe the underlying concept but not able to solve the problem	Not able to use the correct concept to solve a problem

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.)

Natural Gas; Manufactured gas; Biogas; Conventional/unconventional gas; LNG; LPG; Gas combustion; Gas properties and inter-changeability; Supply reliability; Smart metering; Energy efficiency; Energy conversion; Gas-fired equipments; New energy vehicles; Combined-Heat-Power; Methane hydrate; Hydrogen production, economy and technologies; Fuel cells

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.)

NIL

2.2 Additional Readings

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

1.	Natural Gas Engineering Handbook, Guo, Boyan, Ghalambor, Ali, 2nd ed. Elsevier Science, 2012.
2.	Advanced Natural Gas Engineering, Wang, Xiuli, Economides, Michael. Elsevier Science, 2013
3.	Natural Gas Engineering and Safety Challenges: Downstream Process, Analysis, Utilization and Safety, Nasr, G.G., Connor, N. E., Springer 2014
4.	Combustion Engineering and Gas Utilisation, third edition, edited by J. R. Cornforth, British Gas
5.	Gas Engineers Handbook, Industrial Press Inc. (1968)
6.	Tolley's Domestic Gas Installation Practice (Gas Service Technology Volume 2), Edited by Frank Saxon