SEE4121: GAS ENGINEERING

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Gas Engineering

Subject Code
SEE - School of Energy and Environment
Course Number
4121

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

Course Duration
One Semester

Credit Units
3

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
SEE2002 Chemical Sciences for Energy and Environmental Engineers; and
SEE2101 Engineering Thermofluids I

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course is mainly related to gas engineering theories and technologies that are commonly used in our society. Operation principles of basic gas production, gas transportation systems and gas utilization systems, their advantages, and major drawbacks will be taught in the course.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the basic principles of gases (e.g. gas properties, interchangeability of gases, gas measurement fundamental, etc.). Familiarize the energy market and HK gas regulations. Comprehend the installation piping designs.	10		x	
2	Describe the manufacturing of the common types of gas in Hong Kong, i.e. Town Gas and LPG. Introduce the production or extraction of other gases (conventional and unconventional) E.G., NG, SNG, Hydrogen, Coal Bed Methane etc. Perform the HAZOP study and risk assessment of a production plant.	30		x	
3	Describe the gas transportation means. Analyses and design the supply and demand network to household. Identify the innovative technologies used in gas industry.	30		x	
4	Describe different gas utilization systems in society (domestic, commercial and industrial) and understand their principles and designs. Recognise the growing applications of hydrogen energy.	30		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	Through lectures, students will discuss and learn key concepts, including theories related to gas engineering.	1, 2, 3, 4	3

2	Class demonstration or site visit	Through class demonstrations or site visits, students will solidify their understanding through practical experiences.	1, 2, 3, 4	(Optional)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments Several assignments will be given throughout the semester. Through the assignments, students will demonstrate their understanding of the underlying concepts of the measurements, handling, design, operation, and applications of various gases (gas systems).	1, 2, 3, 4	25	-	Yes
2	In-class test Students will complete a mid-term test to demonstrate their ability to apply knowledge to analyze and solve problems related to gas engineering.	1, 2, 3, 4	25	-	No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

Final exam will test students' ability to integrate knowledge learned throughout the course to analyze and solve problems related to gas engineering.

Examination duration: 2 hrs

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

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

a. obtain at least 30% of the total marks allocated towards continuous assessment (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);
b. obtain at least 30% of the total marks allocated towards final examination (if applicable); and
c. meet the criteria listed in the section on Assessment Rubrics.

Assessment Rubrics (AR)

Assessment Task

1. Assignment

Criterion

Ability to analyze and solve questions related to gas engineering

Excellent (A+, A, A-)

Excellent understanding of concepts and ability to analyze and solve problems related to gas engineering

Good (B+, B, B-)

Good understanding of concepts and ability to analyze and solve problems related to gas engineering

Fair (C+, C, C-)

Acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Marginal (D)

Marginally acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Failure (F)

Poor understanding of concepts and ability to analyze and solve problems related to gas engineering

---

Assessment Task

2. In-class test

Criterion

Ability to analyze and solve practical problems related to gas engineering

Excellent (A+, A, A-)

Excellent understanding of concepts and ability to analyze and solve problems related to gas engineering

Good (B+, B, B-)

Good understanding of concepts and ability to analyze and solve problems related to gas engineering

Fair (C+, C, C-)

Acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Marginal (D)

Marginally acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Failure (F)

Poor understanding of concepts and ability to analyze and solve problems related to gas engineering

Assessment Task

3. Final exam

Criterion

Ability to analyze and solve practical problems related to gas engineering

Excellent (A+, A, A-)

Excellent understanding of concepts and ability to analyze and solve problems related to gas engineering

Good (B+, B, B-)

Good understanding of concepts and ability to analyze and solve problems related to gas engineering

Fair (C+, C, C-)

Acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Marginal (D)

Marginally acceptable understanding of concepts and ability to analyze and solve problems related to gas engineering

Failure (F)

Poor understanding of concepts and ability to analyze and solve problems related to gas engineering

Part III Other Information

Keyword Syllabus

Gas and energy market; interchangeability of gases; gas measurement fundamentals; gas ordinance; gas exploration and production methods; gas plant operation; coal gasification; gas plant maintenance; process safety; gas transportation means; flow properties; gas network development; gas network operation and maintenance; residential gas applications; commercial and industrial gas applications

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
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