

GE2339: SMART CITY - A SYSTEMS ENGINEERING PERSPECTIVE

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Smart City - a Systems Engineering Perspective

Subject Code

GE - Gateway Education

Course Number

2339

Academic Unit

Systems Engineering (SYE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

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

GE Area (Primary)

Area 3 - Science and Technology

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

ADSE2339 Smart City – a Systems Engineering Perspective

Part II Course Details

Abstract

The 21st century is an era of internet, information and data. In this course, students will explore the implications and opportunities for the development of smart cities and industries in Hong Kong and the region. They will learn from a systems engineering perspective in which they will focus on smart city development, the use of sensors, system design and development, the Internet of Things (IoT), data analytics and visualisation, and intelligent manufacturing. Students will also learn how these skills are influencing and shaping urban development. In addition, students will understand better the roles of systems engineers in today's information era and recognize the importance of intelligent systems in the modern world. Students learning in this course will be based on cases presented throughout the course. Students will also work on their smart city project by building a prototype smart city (IoT) solution. Furthermore, student's learning will be enriched by company visits and/or guest lectures from industrial engineering and management professionals and eminent professors.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Elaborate on the implications of internet, information, technology and data on the development of smart city and intelligent manufacturing	30	x	x	
2	Apply and interpret data tools for smart city solutions; tools include mobile applications, machine learning, IoT, and sensor technology	20		x	
3	Discuss issues of ethics and privacy within smart city development	10	x		
4	Produce a prototype of an effective smart solution and communicate clearly the results the assignments	30		x	x
5	Recognise how data-driven and smart solutions can be used to drive innovative thinking in modern enterprise management	10	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	Large class activity	Weekly lectures with group discussion and Q&A and guest lectures.	1, 3, 5	2 hrs/week

2	Small group laboratory	Weekly (computer) sessions for discussion of cases, constructing smart city prototypes, applying data analytics and presenting case results.	1, 2, 4, 5	2 hrs/week
3	Out-of-classroom activity	Complementary out-of-class activities (such as company visits) will be organized	3, 5	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	First project (Mandatory) Theme: block-based programming, smart city and data understanding	2, 5	20	
2	Second project (Mandatory) Theme: development of smart city and/or smart industry prototype solution	1, 3, 4	40	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

To pass the final exam, students must get 40 points out of 100 or higher. If one or more of the above criteria are not met, the student will receive an overall grade F (fail) for the whole course.

Assessment Rubrics (AR)**Assessment Task**

First project

Criterion

Written work and understanding of subject matter

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

Second project

Criterion

Group participation, oral presentation and written work

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

Final exam

Criterion

Subject matter understanding

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

- Smart city and smart industry
- IoT, system design
- Data visualization, block-based programming
- Modern industrial and enterprise management
- Systems engineering and engineering management
- Data-driven and innovative thinking

Reading List

Compulsory Readings

Title	
1	(To be announced on Canvas)

Additional Readings

Title	
1	(To be announced on Canvas)

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

2

PILO 3: Demonstrate critical thinking skills

1, 5

PILO 4: Interpret information and numerical data

2

PILO 5: Produce structured, well-organised and fluent text

4

PILO 6: Demonstrate effective oral communication skills

4

PILO 7: Demonstrate an ability to work effectively in a team

4

PILO 9: Value ethical and socially responsible actions

3

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

2, 5

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

Final project reports