

# GE2339: SMART CITY - A SYSTEMS ENGINEERING PERSPECTIVE

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## Effective Term

Summer Term 2023

## 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. This course aims to explore its implication and opportunity for development of smart city and industry, in Hong Kong and the region. We will investigate this from a systems engineering perspective in which emphasis will be placed smart city development, the use of sensors, system design and development, internet of things (IoT), data analytics and visualisation, and intelligent manufacturing. Students will learn about how these skills are influencing and shaping urban development. This course will help students to understand better the roles of systems engineers in today's information era, and to recognize the importance 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 own 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 the 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.

### Teaching and Learning Activities (TLAs)

TLAs	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

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**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

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**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

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## 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