ADSE2339: SMART CITY - A SYSTEMS ENGINEERING PERSPECTIVE

Effective Term
Summer Term 2023

Part I Course Overview

Course Title
Smart City - a Systems Engineering Perspective

Subject Code
ADSE - Advanced Design and System Engineering
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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
GE2339 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

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)