CA3324: ADVANCED SURVEYING STUDIO

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Advanced Surveying Studio

Subject Code
CA - Civil and Architectural Engineering
Course Number
3324

Academic Unit
Architecture and Civil Engineering (CA)

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
Nil

Part II Course Details

Abstract

The course aims to provide essential knowledge of spatial data analysis, geo-informatics, and their integration into sustainable urban development and infrastructure planning.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Design localised AI models to solve urban challenges		x	x	x
2	Apply software to construct and analyse city information models for smart city planning and geospatial visualisation		x	x	x
3	Design smart city solutions that integrate low-altitude economy principles into urban frameworks		x	x	x
4	Demonstrating critical thinking and problem-solving skills for evaluating urban systems through hands-on projects in the context of sustainable city development		x	x	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	Lectures	Students will engage in formal lectures to gain knowledge about theoretical concepts, tools, and applications related to AI, low-altitude economy, and smart city modelling	1, 2, 3, 4	2 hours/week
2	Tutorials	Student will engage in tutorial activities and coursework to extend their knowledge in designing smart city models and integrating low-altitude economy considerations	1, 2, 3, 4	1 hour/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignment	1, 2, 3, 4	30		Yes
2	Mid-term test	1, 2, 3, 4	20		No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Assessment Rubrics (AR)

Assessment Task

Assignment

Criterion

Evaluating students' proficiency to develop a city information model as well as the integration of low-altitude economy principles into a smart city design proposal

Excellent (A+, A, A-)

Exceptional

Good (B+, B, B-)

High

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not reaching marginal level

Assessment Task

Mid-term test

Criterion

Assessing students' understanding of key concepts and techniques covered in the course

Excellent (A+, A, A-)

Exceptional

Good (B+, B, B-)

High

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reaching marginal level

Assessment Task
End-term test

Criterion
Evaluating students' ability to synthesise theoretical knowledge and practical skills in course topics through a combination of essay and problem-solving questions

Excellent (A+, A, A-)
Exceptional

Good (B+, B, B-)
High

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reaching marginal level

Part III Other Information

Keyword Syllabus
Artificial Intelligence (AI); Python Programming; Localised AI Models; City Information Modelling (CIM); Smart City Design; Low-Altitude Economy; Urban Simulation; Geospatial Analysis; Sustainable Urban Planning; Drone Technology; Data Visualisation; Spatial Data Processing; Urban Systems Integration

Reading List

Additional Readings

	Title
1	Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.
2	Lutz, M. (2013). Learning Python (5th ed.). O'Reilly Media.
3	Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Systems and Science (4th ed.). Wiley
4	Batty, M. (2013). The New Science of Cities. MIT Press.
5	Laurini, R. (2020). Geographic Information Systems: From Spatial Data to Smart Cities. CRC Press

6	Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.
7	Bishop, C. M. (2006). Pattern Recognition and Machine Learning. Springer.
8	Hillier, B., & Hanson, J. (1989). The Social Logic of Space. Cambridge University Press.
9	Karvonen, A., Cugurullo, F., & Caprotti, F. (2018). Inside Smart Cities: Place, Politics and Urban Innovation. Routledge.
10	Townsend, A. M. (2013). Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia. W.W. Norton & Company.