CA3388: SPATIAL DATA AND GEO-INFORMATICS

New Syllabus Proposal

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Spatial Data and Geo-informatics

Subject Code
CA - Civil and Architectural Engineering
Course Number
3388

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

Additional Information

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	Explain the core principles and technologies of spatial data and geo-informatics.		x	x	
2	Apply geospatial tools to analyse and visualise spatial data for architecture and civil engineering applications.		x	x	x
3	Describe the role of 3D mapping and geospatial data in designing smart cities and sustainable urban environments.		x	x	x
4	Demonstrate practical skills in using software for spatial analysis, mapping, and urban planning solutions.		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	Lecture	Students will engage in formal lectures to gain knowledge about theoretical concepts, case studies, and emerging trends in spatial data and geo-informatics.	1, 2, 3, 4	2 hours/week
2	Tutorial/ Assignment	Student will engage in tutorial activities and coursework to extend their knowledge in applications of spatial data and geo-informatics.	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/quiz	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

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%

Assessment Rubrics (AR)

Assessment Task

Assignment

Criterion

Assessing students' ability to apply geospatial tools and techniques to analyse spatial data and present solutions relevant to architecture and civil engineering problems.

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/quiz

Criterion

Evaluating students' understanding of key concepts, principles, and terminology in spatial data and geo-informatics 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
Examination

Criterion
Assessing students' comprehensive knowledge of course topics through theoretical 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
Geographical Information System (GIS); Spatial analysis; Photogrammetry; Point clouds; 3D Mapping; Remote Sensing; Satellite imagery; Geospatial Data; Smart cities; Sustainability

Reading List

Additional Readings

	Title
1	Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). Geographic Information Systems and Science (4th ed.). Wiley.
2	Jensen, J. R. (2015). Introductory Digital Image Processing: A Remote Sensing Perspective (4th ed.). Pearson.

3	Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). Remote Sensing and Image Interpretation (7th ed.). Wiley.
4	Batty, M. (2013). The New Science of Cities. MIT Press.
5	Campbell, J. B., & Wynne, R. H. (2011). Introduction to Remote Sensing (5th ed.). Guilford Press.
6	Heywood, I., Cornelius, S., & Carver, S. (2011). An Introduction to Geographical Information Systems (4th ed.). Pearson.
7	Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). Principles of Geographical Information Systems (3rd ed.). Oxford University Press.
8	Wolf, P. R., Dewitt, B. A., & Wilkinson, B. E. (2014). Elements of Photogrammetry with Applications in GIS (4th ed.). McGraw-Hill Education.
9	DeMers, M. N. (2008). Fundamentals of Geographic Information Systems (4th ed.). Wiley.
10	Kresse, W., & Danko, D. M. (2012). Springer Handbook of Geographic Information. Springer.