CA5564: SENSING AND DATA ANALYTICS FOR SMART BUILDINGS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Sensing and Data Analytics for Smart Buildings

Subject Code
CA - Civil and Architectural Engineering
Course Number
5564

Academic Unit
Architecture and Civil Engineering (CA)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate 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 provides knowledge on the fundamentals of sensing technologies and data analytics for smart buildings. The course covers topics related the sensors, sensing technologies, the internet of things, data analytics, machine learning, etc. It prepares the students with sufficient fundamental technological background for the implementation of modern electronics and information technologies.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Introduce the fundamental of sensing and sensing network technologies in smart buildings			x	
2	Introduce the data analytics in the smart buildings			x	
3	Understand the principles and theoretical background of sensing and data analytics theory		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; seminars	Introduce the fundamentals of sensing and data analytics in the smart building	1, 2, 3	2
2	Tutorials; site visits	Explore and discuss the current application of sensing and data analytics in practices through tutorials and site visits	1, 2, 3	1

Additional Information for LTAs

Semester Hours: 3 hours per week
Lecture/Tutorial/Laboratory Mix: Lecture (2); Tutorial (1); Laboratory (0)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Mid-term test	1, 2, 3	25	Summative assessment	No
2	Assignments	1, 2, 3	25	Summative assessment	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% individual coursework components and an overall mark of at least 40%.

Assessment Rubrics (AR)

Assessment Task

Mid-term test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and technologies of the sensing and data analytics

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

Assignment (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

1. CAPACITY to INQUIRE and ANALYSE the potential application of the sensing technologies and data analytics
2. ABILITY to ARTICULATE and EXPLAIN the rational, substantiated, and original discussion of relevant knowledge

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
Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and technologies of the sensing and data analytics

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
Mid-term test (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and technologies of the sensing and data analytics

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

1. CAPACITY to INQUIRE and ANALYSE the potential application of the sensing technologies and data analytics
2. ABILITY to ARTICULATE and EXPLAIN the rational, substantiated, and original discussion of relevant knowledge

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

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(B-, C+, C) Basic

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Assessment Task

Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and technologies of the sensing and data analytics

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(B+, B) Significant

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(B-, C+, C) Basic

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(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Sensing technologies, sensor technologies, data analytics, big data, data processing, internet of things.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Nil