



# Course Specification

## (Bachelor)

Course Title: **Smart Cities**

Course Code: **COE4410**

Program: **Bachelor of Construction Engineering**

Department: **Civil and Environmental Engineering Department**

College: **College of Engineering and Computing in Al-Qunfudhah**

Institution: **Umm Al-Qura University**

Version: **4<sup>th</sup>**

Last Revision Date: **14 January 2025**



## Table of Contents

A. General information about the course:.....	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods.....	4
C. Course Content.....	4
D. Students Assessment Activities.....	5
E. Learning Resources and Facilities.....	5
F. Assessment of Course Quality.....	5
G. Specification Approval.....	6



## A. General information about the course:

### 1. Course Identification

<b>1. Credit hours: ( 3 )</b>					
<b>2. Course type</b>					
<b>A.</b>	<input type="checkbox"/> University	<input type="checkbox"/> College	Department	<input type="checkbox"/> Track	Others
<b>B.</b>	Required		Elective		
<b>3. Level/year at which this course is offered: ( Level 9-10/ Year 5 )</b>					
<b>4. Course General Description:</b>					
<p>This course provides an introduction to the concept, design, and development of smart cities. It explores the integration of technology, data analytics, and sustainable practices to improve urban living. Key topics include IoT (Internet of Things), urban mobility, energy efficiency, smart governance, and citizen engagement. Students will analyze case studies, assess smart city solutions, and explore ethical, social, and environmental impacts. The course equips learners with the skills to design and evaluate smart city initiatives for sustainable urban development.</p>					
<b>5. Pre-requirements for this course (if any):</b>					
Highway Engineering COE4501					
<b>6. Co-requisites for this course (if any):</b>					
<b>7. Course Main Objective(s):</b>					
<p>The main objective is to equip students with a comprehensive understanding of the principles, technologies, and strategies involved in developing smart cities, focusing on the integration of digital infrastructure, sustainable urban development, data-driven decision-making, and innovative solutions to enhance urban living, environmental sustainability, and efficient resource management</p>					



## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	<b>3 credit hours</b>	<b>100%</b>
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4	Distance learning		

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	<b>Lectures</b>	<b>45</b>
2.	<b>Laboratory/Studio</b>	
3.	<b>Field</b>	
4.	<b>Tutorial</b>	
5.	<b>Others (specify)</b>	
<b>Total</b>		<b>45</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	<b>Understand the fundamental concepts and components of smart cities.</b>	<b>K1</b>	<b>Interactive learning</b>	<b>Midterm Exam, Final Exam</b>
1.2	<b>Identify key technologies used in smart city development, such as IoT, AI, and big data.</b>	<b>K2</b>	<b>Self-directed learning</b>	





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.3	Explain the role of digital infrastructure in enhancing urban services and sustainability.	K2		
2.0	<b>Skills</b>			
2.1	Analyze and evaluate smart city technologies and their applications	S2	Interactive learning	Midterm Exam, Final Exam
2.2	Apply urban data analysis techniques for decision-making and resource optimization.	S4	Self-directed learning	
3.0	<b>Values, autonomy, and responsibility</b>			
3.1	Evaluate sustainability and responsible innovation in urban development.	V1	Interactive learning	Midterm Exam, Final Exam
3.2	Demonstrate ethical data use and privacy protection in smart city systems.	V1	Self-directed learning	

### C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Smart Cities	3
2.	Smart City Technologies (Internet of Things (IoT), Artificial Intelligence (AI), and Big Data), and Role of sensors and real-time data collection	6
3.	Digital Infrastructure and Connectivity (Smart grids, 5G networks Integration of ICT for efficient city management)	6
4.	Sustainable Urban Development (Smart energy systems, Sustainable mobility)	6
5.	Midterm Exam	3
6.	Smart governance & policy frameworks (E-governance, digital citizen services)	3
7.	Urban Data Analytics and Decision-Making (Data collection, visualization, DM)	6
8.	Smart City Applications (Case studies)	3
9.	Challenges and Risks in Smart City Development (Cybersecurity, Technological barriers)	6





10.	Future Trends and Innovations in Smart Cities (Emerging technologies like digital twins, autonomous systems, role of AI in future urban planning)	3
<b>Total</b>		<b>45</b>

#### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	4, 6, 12	15%
2.	Homework	3, 9, 13	15%
3.	Midterm Exam	8	30%
4.	Final Exam	16 or 17	40%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

#### E. Learning Resources and Facilities

##### 1. References and Learning Resources

Essential References	Khan, M.A., Algarni, F., and Quasim, M.T. (2021) Smart Cities: A Data Analytics Perspective. Cham: Springer
Supportive References	World Bank Group (n.d.) e-Learning Course on Smart City
Electronic Materials	
Other Learning Materials	

##### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<b>Classroom with minimum capacity of 30 students</b>
<b>Technology equipment</b> (projector, smart board, software)	<b>Projector, whiteboard</b>
<b>Other equipment</b> (depending on the nature of the specialty)	





## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Lecturer / Students	Direct / Indirect (Grades, surveys)
Effectiveness of Students assessment	Faculty	Indirect (Barriers to understand successor course)
Quality of learning resources	Lecturer	Direct (Grades)
The extent to which CLOs have been achieved	Lecturer / Faculty	Direct (Grades)
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	Civil and Environmental Engineering Department Council in Al-Qunfudah
<b>REFERENCE NO.</b>	The fifteenth session of the academic year 1446
<b>DATE</b>	01/05/2025

