



Course Specification

(Postgraduate Programs)

Course Title: Wireless Sensor Networks

Course Code: CE6201

Program: Master of Science in Computer Engineering

Department: Computer and Network Engineering

College: College of Computing

Institution: Umm Al-Qura University

Version: 2.0

Last Revision Date: 12/4/2025



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:	4
C. Course Content:.....	5
D. Students Assessment Activities:.....	5
E. Learning Resources and Facilities:	6
F. Assessment of Course Quality:	6
G. Specification Approval Data:	7



A. General information about the course:

1. Course Identification:

1. Credit hours: (3)			
2. Course type			
A.	<input type="checkbox"/> University	<input type="checkbox"/> College	<input type="checkbox"/> Department <input checked="" type="checkbox"/> Track
B.	<input checked="" type="checkbox"/> Required Required in the Wireless Communication and Networks Track		<input checked="" type="checkbox"/> Elective in all other tracks
3. Level/year at which this course is offered: (Level 3)			
4. Course General Description:			
This course provides an in-depth understanding of wireless and sensor networks and covers fundamental concepts, protocols, and design principles. The course explores the latest research and development in the field and covers topics such as architecture, wireless sensor networks, routing and data dissemination, energy-efficient protocols, security, and privacy.			
5. Pre-requirements for this course (if any):			
None			
6. Co-requisites for this course (if any):			
None			
7. Course Main Objective(s):			
The main objective of this course is to understand and analyze the fundamental principles, architectures, and protocols of wireless sensor networks, focusing on energy efficiency, scalability, and real-world applications.			

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		



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

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

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
1.0	Knowledge and understanding			
1.1	Explain the fundamental principles, architecture, and components of wireless sensor networks.	K2	Lectures	Written Exams
1.2	Critically review current research trends and challenges in WSNs and present your findings.	K1	Research papers	Project, Report and Presentation
2.0	Skills			
2.1	Design and implement sensor mote architecture	S1	Lectures and project	Written Exams and project
2.3	Evaluate various MAC protocols, routing algorithms, and data dissemination strategies used in WSNs.	S4	Lectures and project	Written Exams and project
2.4	Identify potential security threats in WSNs and propose countermeasures to ensure data integrity, confidentiality, and availability.	S2 and S4	Lectures and project	Written Exams and project
2.5	Communicate effectively through a written report embodying the design, implementation, evaluation of a project in WSNs	S3	Project	Project, Report and Presentation



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Critically review current research trends and challenges in WSNs and present your findings.	V1	Research papers	Project, Report and Presentation
3.2	Work in a team to implement a project in WSNs	V2	Group assignments and project	Group assignments and project

C. Course Content:

No	List of Topics	Contact Hours
1.	Basics of wireless and sensors networks	3
2.	Sensor architecture and design	5
3.	MAC in WSNs	4
4.	Routing in WSNs	5
5.	Overview of transport layer in WSNs	5
6.	Sensors data management	5
7.	Security and privacy	5
8.	Case studies	5
9.	Emerging Trends in Wireless Sensor Network	8
Total		45

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm	7	20
2.	Assignments and/or Quizzes	Throughout the semester	20
3.	Project	13	30
4.	Presentation/report on scientific article(s)	13-15	10
5.	Final Exam	15	20

*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	Wireless Sensor Networks: Principles and Practice By Fei Hu and Xiaojun Cao, 1st Edition, Auerbach Publications, 2010, ISBN-10: 9781420092158, ISBN-13: 978-1420092158
	Research papers in the field of WSNs
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Educational and Research Facilities and Equipment Required:

Items	Resources
Facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Projector
Other equipment (Depending on the nature of the specialty)	

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leaders	Indirect
Effectiveness of students' assessment	Program Leaders	Direct
Quality of learning resources	Students, Faculty	Indirect
The extent to which CLOs have been achieved	Students, Faculty, Program Leaders	Direct and Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)





G. Specification Approval Data:

COUNCIL /COMMITTEE	Computer and Network Engineering Department Council
REFERENCE NO.	The 18th Session Of The Academic Year 1446
DATE	15/4/2025

