



Course Specification

— (Bachelor)

Course Title: **Wireless and Sensor Networks**

Course Code: **CENX 443**

Program: **B.S. in Computer Engineering**

Department: **Department of Computer Engineering**

College: **College of Computer and Information Sciences**

Institution: **King Saud University**

Version: *Course Specification Version Number*

Last Revision Date: *Pick Revision Date.*

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	5
F. Assessment of Course Quality	6
G. Specification Approval	6





A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: (Level 9 or 10)

4. Course general Description:

Introduction to Wireless and Mobile Networks: Fundamental concepts in mobile wireless networks, Characteristics of wireless links, RF propagation, path loss models; Fixed assignment Multiple access techniques: FDMA/TDMA/CDMA, Performance of Fixed assignment techniques, Erlang-B model; The cellular concept: frequency reuse, cell architecture and handoff protocols; Cellular Technologies: 2G/GSM, 3G/UMTS/HSPA, 4G/LTE/LTE-A; Wireless LANs: multiple access techniques for LANs, IEEE 802.11 (WiFi); Mobility management: Mobile IP protocol.

5. Pre-requirements for this course (if any):

CENX 441, Computer Networks

6. Co-requirements for this course (if any):

7. Course Main Objective(s):

This course aims at recognizing the principles of wireless and mobile networks, challenges facing wireless network design and the latest technologies in the field.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours per week	100%
2	E-learning		
3	Hybrid - 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	15
5.	Others (specify)	
Total		60

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the main characteristics of wireless links and MAC protocols.	1	Lectures and Tutorials	Exams and Homework
1.2	Describe Wireless LAN and PAN architectures.	1	Lectures	Exams and Homework
1.3	Describe the principle of cellular concept, network planning and resource management.	1	Lectures	Exams and Homework
1.4	Describe the problems of mobility in wireless networks and Mobile IP protocols.	1	Lectures	Exams and Homework
2.0	Skills			
2.1	Illustrate the evolution of cellular network technologies.	7	Lectures and Tutorials	Exams and Homework
2.2	Apply concepts of wireless sensor networks: architectures and protocols.	2	Lectures and Tutorials	Exams and Homework
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				



C. Course Content

No	List of Topics	Contact Hours
1.	Characteristics of Wireless Links	8
2.	Multiple access techniques FDMA/TDMA/CDMA	8
3.	Wireless LANs and Personal Area Networks	6
4.	The cellular concept architecture and resource management.	8
5.	Cellular Technologies (recent generations.)	18
6.	Wireless sensor networks: architecture, energy efficiency, clustering and routing.	4
7.	Mobility management and Mobile IP protocol	5
8.	Review and Evaluation.	3
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz	Every 2-3 weeks	10%
2.	Midterm Examination (1)	7	20%
3.	Midterm Examination (2)	12	20%
4.	Homework Assignments and/or Project	Every 2 weeks	10%
5.	Final Exam	End	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	Principles of Wireless Networks: A Unified Approach, Pahlavan, K. and Krishnamurthy, P., Prentice Hall PTR, 2001.
Supportive References	Wireless Communications: Principles and Practice, Rappaport, T., Prentice Hall, 2002. From GSM to LTE-Advanced: An Introduction to Mobile Networks and Mobile Broadband, Sauter, M., John Wiley & Sons, 2014. Computer Networking: A Top-Down Approach, J. Kurose and K. Ross, 6th Ed., Addison-Wesley, 2013.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with number of seats enough to accommodate enrolled students.
Technology equipment (projector, smart board, software)	Computer Network Lab room with number of stations enough to accommodate enrolled students.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Department Council	Course reports are evaluated by the Department Council.
Effectiveness of Students assessment	Faculty-Peer Review	Final examination is moderated.
Quality of learning resources	Students	Indirect – Edu-gate survey.
The extent to which CLOs have been achieved	Students	Attainment level of every CLO is measured directly.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	