Course Specification
— (Bachelor)

Course Title: Wireless Technologies

Course Code: ITEC 353

Program: Bachelor in Information Technology (BIT)

Department: Computer Science

College: College of Engineering and Computer Science

Institution: Jazan University

Version: 1

Last Revision Date: 16/01/2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

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

3. Level/year at which this course is offered: (6)

4. Course General Description:

This course introduces the concept of wireless world through wireless networking and wireless communication to the students. The course presents the major wireless concepts like signals and transmission, access points, wireless routing, WLANs, speed spectrum, channel capacity (Nyquist bandwidth and Shanon Capacity formulas), FHSS, DSSS, OFDM, IR and Wireless standards. The course further takes the students in the depth of core wireless concepts like ad hoc networking. Wireless application protocols, Bluetooth and multiple access techniques (FDMA, TDMA and CDMA). Lately, the course covers the concepts of Microwave and Satellite based communication with the focus on service types and classification of orbits. In addition, the course highlights the 5G communication systems prospects and challenges.

5. Pre-requirements for this course (if any): ITEC 251

6. Co-requisites for this course (if any): N/A

7. Course Main Objective(s):

1. Explain the architecture and application of current and next generation wireless networks: Cellular, WLANs, Ad Hoc networks and mobile networks.
2. Understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in wireless communication networks.
3. Describe the key concepts and techniques underlying modern physical layer wireless and mobile communications: radio propagation modelling CDMA and OFDM.
4. Analyze various medium access and resource allocation techniques such as scheduling for TDMA/FDMA/CDMA-based wireless networks.

5. Differentiate between wireless networking and wireless communication.

Classify the various protocols used in wireless networking.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	56	100
2	E-learning	N/A	--
3	Hybrid • Traditional classroom • E-learning	N/A	--
4	Distance learning	N/A	--

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	24
2.	**Laboratory/Studio**	24
3.	**Field**	N/A
4.	**Tutorial**	--
5.	**Others (Revision + Final Lab or Case-Study Exam)**	08
Total		56

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	**Analyze** the basic concepts of wireless communication, and wirelessnetworking.	K1	• Lectures/ • Presentations MediaLecture	MidTerm Exam / Final Exam /Quiz
1.2	**Design** the concept of Signals and transmission, wireless		• Lectures/ • Presentations MediaLecture	MidTerm Exam / Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	routing, speed spectrum, channel capacity and wireless standards	K2		
2.0	**Skills**			
2.1	**Apply** Adhoc networking and Wireless Application Protocols	S1	• Lectures/Presentations • Media Lecture Lab demonstration	Final Exam, /Internal Lab Exam/ Assignment-1
2.2	**Implement** the Multiple Access Techniques such as FDMA,TDMA,CDMA	S2	• Lectures/Presentations • Media Lecture • Lab Demonstration	Final Exam, / Internal Lab Exam/ Assignment-1
2.3	**Analyse** 5G communications prospects and challenges	S3	• Lectures/Presentations • Media Lecture • Lab Demonstration	Final Exam, / Final Lab Exam/ Assignment-2
3.0	**Values, autonomy, and responsibility**			
3.1	**Develop** the ability to work with network commands	V1	• Lab Exercise	Final Exam, /Final Lab Exam/ Assignment-2

C. Course Content

No	List of Topics	Contact Hours
1.	**Chap-1: Wireless Technology fundamentals:** • Wireless comes of age • The Global Cellular Network • Broadband • Wireless Communication • Bluetooth	4T + 4P

	• Transmission Fundamentals Channel Capacity	
2.	**Chap-2: Wireless Routing and Access Points:** • Wireless Routing • Types of Routing • Access Points • Categories of Access Points • WLAN • Working of WLAN Spread Spectrum categories	4T + 4P
3.	**Chap-3: Wireless Transmission:** • FDM • OFDM-Advantages • OFDM Variants • Infrared Wireless Transmission • Working of Infrared Communications Features of Infrared Communications	4T + 4P
4.	**Chap-4: Multiple Access Protocols and Wireless Standards:** • Multiple Access Protocols • ALOHA • CSMA • FDMA • TDMA • Wireless Standards • Bluetooth Technology • Working of Bluetooth Applications of Bluetooth	4T + 4P
5	**Chap-5: Wireless Application Protocol and AD-hoc Networking** • Wireless Application Protocol • WAP Protocol Stack • WAP Advantages and Disadvantages • Ad-hoc networking • Types • Infrastructure • How to connect computers to Ad-hoc network	4T + 4P

6	**Chap-6: Satellite Communications and 5G Communications:** • Introduction • Satellite Parameters • Satellite Orbits • Types of Orbits • 5G communications • Working of 5G communications • Impacts of 5G • Benefits of 5G • Challenges in 5G	4T + 4P
Total		**48**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid -Term Exam (Chapter 1 and 2)	7th/ 8th Week	15%
2.	Assignment-1 (Chapter 3,4)	8th week	10%
3.	Assignment-2 (Chapter 5,6)	10th Week	15%
4	Internal Lab Exam (Program 1 to 5))	10th Week	10%
5	Final Lab (All programs)	12 th week	10%
6	Final Exam -All Chapters	14 thWeek	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	William Stalling, "Wireless Communications Networks and System, 1st Edition, 2015, Pearson, ISBN-13: 978-0133594171
Supportive References	Wireless Networks", 3rd Edition, 2014, ISBN-13: 978-0071819831 Koushik Sinha, "Wireless Networks and Mobile Computing", 1st Edition, 2015, Chapman and Hall/CRC, ISBN-13: 978-1482227932
Electronic Materials	--
Other Learning Materials	Cisco Packet Tracer

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One lecture room for each section (maximum 25 students at a time) Each Lab should be equipped with minimum of 25 computers.
Technology equipment (projector, smart board, software)	Projector, Smart Board Cisco Packet tracer
Other equipment (depending on the nature of the specialty)	--

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Faculty	Direct
Quality of learning resources	Track Leaders	Direct
The extent to which CLOs have been achieved	HOD/QAU	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	MEETING NO. 1
DATE	15/01/2025