



Course Specifications

Course Title:	Wireless Networks
Course Code:	503551-3
Program:	Bachelor in Computer Engineering
Department:	Department of Computer Engineering
College:	College of Computers and Information Technology
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 10/5
4. Pre-requisites for this course (if any): Advanced Computer Network (503546-3)
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course covers the state-of-the-art in the field of wireless networks, and their standards and architectures. A description of the existing standards, mainly 2G, 3G and LTE is presented then a description LTE Advanced (LTE-A) and 5G and future trends are followed. The fundamental concepts and standards related to Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Internet of Things, D2D communication, Cognitive Radio, Antennas, Propagation and Ad hoc networks (MANET, VANET) are also covered,</p>
<p>2. Course Main Objective</p> <p>This course aims to present the state-of-the-art in the field of mobile and wireless Networks through the following objectives:</p> <ol style="list-style-type: none"> 1. Students will learn fundamental principles and concepts of the existing standards, mainly 2G, 3G and LTE.



2. Students will learn fundamental principles and concepts of LTE Advanced (4G), 5G, Cognitive Radio, and D2D communication.
3. Student will be able to distinguish between protocols and standards for Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Antennas, Propagation, Internet of Things, and Ad hoc networks (MANET, VANET).

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Understand the Principles of the existing standards, mainly 2G, 3G, LTE Advanced (4G), 5G, D2D communication.	K1
1.2	Distinguish between protocols and standards for Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Internet of Things, Cognitive Radio, Antennas, Propagation and Ad hoc networks.	K1
1...		
2	Skills :	
2.1	Analyze and recognize techniques and protocols used for 2G, 3G, LTE, LTE Advanced (4G), 5G, and D2D communication.	S2
2.2	Analyze and recognize protocols and standards for Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Internet of Things, Cognitive Radio, Antennas, Propagation, and Ad hoc networks.	S2
2...		
3	Values:	
3.1		
3.2		

C. Course Content

No	List of Topics	Contact Hours
1	Mobile Networks: Cellular network, Radio interface, Cell design, Traffic engineering, Principles of cellular network functionalities	4
2	Mobile generation networks: 1G networks to 5G networks	4
3	Long-Term Evolution (LTE): Relevant features of LTE, Network architecture and protocols, Radio resource management, Authentication and authorization	4
4	Fundamentals of the MAC layer and physical layer in LTE, LTE Advanced (LTE-A): HetNet in LTE Advanced, Small cell concepts (Picocell, Femtocells, Relays)	4
5	5G: D2D communication, Vehicular communication, 5G characteristics Massive capacity support, Cognitive Radio, 5G frequencies, Cloud-RAN	4
6	Wireless personal networks (WPAN): IEEE 802.15, Bluetooth, UWB, Wireless Gigabit (WiGig), and Midterm Exam	5
7	Antennas, Propagation, and Wireless Regional Area Network (WRAN): IEEE 802.22	5
8	Internet of Things: Sensor networks, RFID, Near-field communication	5
9	Ad hoc networks: Mobile Ad hoc NETWORK (MANET),	5
10	Vehicular Ad hoc NETWORK (VANET).	5



Total	45
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D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Understand the Principles of the existing standards, mainly 2G, 3G, LTE Advanced (4G), 5G, Cognitive Radio, and D2D communication.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
1.2	Distinguish between protocols and standards for Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Antennas, Propagation, Internet of Things, and Ad hoc networks.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
...			
2.0	Skills		
2.1	Analyze and recognize techniques and protocols used for 2G, 3G, LTE, LTE Advanced (4G), 5G, Cognitive Radio, and D2D communication.	Lecture Discussion Problem Solving Brainstorming Self-Learning	Written Exams Quizzes Assignments Brainstorming Self-Learning
2.2	Analyze and recognize protocols and standards for Wireless personal networks (WPAN), Wireless Gigabit (WiGig), Wireless Regional Area Network (WRAN), Antennas, Propagation, Internet of Things, and Ad hoc networks.	Lecture Discussion Problem Solving Brainstorming Self-Learning	Written Exams Quizzes Assignments Brainstorming Self-Learning
...			
3.0	Values		
3.1			
3.2			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	Continues	5%
2	Midterm Exam	8	20%
3	Project	11	15%
4	Quizzes	Continues	10%
5	Final Exam	16	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:



Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Khaldoun Al Agha, Guy Pujolle, Tara Ali Yahia, Mobile and Wireless Networks, Volume 2, Wiley-ISTE (2016)
Essential References Materials	Sunilkumar S. Manvi, Mahabaleshwar S. Kakkasageri "Wireless And Mobile Networks, Concepts And Protocols", second Edition Willy 2016
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Traditional Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Students	Indirect (Survey)
Effectiveness of teaching and assessment	Students	Indirect (Survey)
Extent of achievement of course learning outcomes	Faculty	Course Report

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)



H. Specification Approval Data

Council / Committee	Computer Engineering Council / Curriculum Committee	
Reference No.		
Date		

