MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Wireless Networks**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☒ **lab** ☒ **Practical**	
Module Code	**IT4102**				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	UGIIII		**Semester of Delivery**	1	
Administering Department	Information Technology		**College**	College of Computer Science and Information Technology	
Module Leader	Ali Abdul Hussein Ibrahim		**e-mail**	Ali.abdulhussein@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	**MSc**	
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Scientific Committee Approval Date	01/09/2026		**Version Number**	V1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IT243	**Semester**	4
Co-requisites module	-	**Semester**	-

Department Head Approval **Dean of the College Approval**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	a. Provide an overview of the history, evolution, and compatibility of wireless standards. b. Identify several special problems related to wireless and mobile computing. c. Contrast between wireless LANs and cellular networks. d. Demonstrate several specific differences between physical networking and wireless networking. e. Compare several different solutions for communications at each network layer. f. Identify several protocols used in wireless communications. g. Perform simulations of wireless networking. h. Describe security issues related to wireless networks. i. Describe performance issues related to wireless networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the history, evolution, and compatibility of wireless standards. 2. Identify and analyze special problems and challenges in wireless and mobile computing. 3. Compare and contrast wireless LANs and cellular networks in terms of architecture, coverage, and mobility support. 4. Differentiate between physical networking and wireless networking, highlighting key differences. 5. Evaluate and compare different solutions for communications at each network layer. 6. Identify and describe protocols commonly used in wireless communications. 7. Perform simulations of wireless networking using appropriate tools and techniques. 8. Describe security issues related to wireless networks and recommend countermeasures. 9. Analyze and address performance issues in wireless networks, including signal strength, quality, and throughput considerations. 10. Understand IP mobility and its implications in wireless networks. 11. Apply theoretical knowledge to real-world scenarios and case studies in wireless networking. 12. Stay informed about emerging trends and advancements in wireless networks.
Indicative Contents المحتويات الإرشادية	1. Introduction to Wireless Networks • Importance and applications of wireless networks • Evolution of wireless standards • Compatibility challenges in wireless communication 2. Wireless Standards and Compatibility • IEEE 802.11 (Wi-Fi) and its variants • Cellular networks (3G, 4G, 5G) • Coexistence and compatibility of different wireless technologies 3. Differences between Physical and Wireless Networking

- Characteristics of wired and wireless mediums
- Media access control techniques in wireless networks
- Error control and flow control mechanisms in wireless networks

4. Solutions for Communications at Each Network Layer
   - Physical layer wireless communication solutions (modulation techniques, antenna design)
   - MAC layer protocols and techniques for wireless networks
   - Network layer routing protocols for efficient wireless communication
5. Network Layer Routing in Wireless Networks
   - Challenges and optimizations for routing in mobile and dynamic environments
   - Ad hoc routing protocols (e.g., AODV, DSR)
   - Hierarchical routing protocols (e.g., OLSR, AODV)
6. Transport and Application Layer Considerations
   - End-to-end transport protocols in wireless networks (TCP, UDP)
   - Application layer adaptations for wireless environments (mobile applications, multimedia streaming)
7. Wireless LANs vs. Cellular Networks
   - Architecture and coverage characteristics of wireless LANs and cellular networks
   - Mobility support and handoff management in cellular networks
   - Spectrum allocation and licensing considerations
8. Protocols Used in Wireless Communications
   - Bluetooth and Bluetooth Low Energy (BLE)
   - Zigbee and other low-power wireless protocols
   - Cellular network protocols (GSM, CDMA, LTE)
9. IP Mobility in Wireless Networks
   - Introduction to IP mobility and its significance in wireless networks
   - Mobile IP and its extensions for seamless mobility support
10. Special Problems in Wireless and Mobile Computing
    - Radio frequency interference and signal propagation challenges
    - Power consumption optimization and battery life management techniques
    - Mobility management and handoff issues
11. Security Issues in Wireless Networks
    - Threats and vulnerabilities in wireless networks
    - Authentication and encryption mechanisms
    - Wi-Fi security protocols (WEP, WPA, WPA2, WPA3)
12. Performance Issues in Wireless Networks
    - Signal strength, quality, and throughput considerations
    - Delay, latency, and jitter optimization techniques
    - Quality of Service (QoS) in wireless networks
13. Simulations of Wireless Networking
    - Introduction to network simulation tools (e.g., ns-3, OPNET)
    - Designing and simulating wireless network topologies

	• Performance evaluation and analysis of simulated networks 14. Emerging Trends in Wireless Networks • 6G and beyond: Future wireless network technologies • Edge computing and fog computing in wireless networks • Wireless charging and energy harvesting 15. Case Studies and Real-World Applications • Examination of real-world wireless network deployments • Wireless sensor networks and Internet of Things (IoT) applications • Mobile ad hoc networks (MANETs) and vehicular networks

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: In-class lectures will cover theoretical concepts, principles, and frameworks related to routing and switching. Lecturers will provide real-world examples and case studies to reinforce understanding. 2. Group Discussions: Group discussions and collaborative activities will encourage students to analyze and discuss complex networking scenarios, fostering critical thinking and problem-solving skills. 3. Online Resources: Access to online resources, including interactive tutorials, e-books, and video lectures, will supplement in-class learning and provide additional support for self-study. 4. Assessments: Formative and summative assessments, such as quizzes, practical exams, and project assignments, will evaluate students' understanding of the concepts, their practical skills, and their ability to analyze and solve networking problems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	50	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدرا يس غ ري المنتظم للطالب خلال الفصل	25	**Unstructured SWL (h/w)** الحمل الدرا يس غ ري المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	3 (15%)	4,6,8,10,12	
	Onsite Assignments	1	5 (5%)	4	all
	Projects	1	5 (5%)	12	all
	Home Work	5	3 (15%)	4,6,8,10,12	all
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Wireless Networks
Week 2	Wireless Standards and Compatibility
Week 3	Differences between Physical and Wireless Networking
Week 4	Solutions for Communications at Each Network Layer
Week 5	MAC Layer Protocols and Techniques
Week 6	Network Layer Routing Protocols for Wireless Networks
Week 7	Transport and Application Layer Considerations
Week 8	Wireless LANs vs. Cellular Networks
Week 9	Protocols Used in Wireless Communications
Week 10	IP Mobility in Wireless Networks
Week 11	Special Problems in Wireless and Mobile Computing
Week 12	Security Issues in Wireless Networks
Week 13	Performance Issues in Wireless Networks
Week 14	Simulations of Wireless Networking
Week 15	Emerging Trends in Wireless Networks

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Title: "Wireless Communications and Networks" Author: William Stallings	No
Recommended Texts	• L. L. Peterson and B. S. Davie. Computer Networks, A Systems Approach. Morgan Kaufman, Fourth edition, 2006. • A. S. Tanenbaum. Computer networks. Prentice-Hall, Fifth edition, 2010	No
Websites	Jim Kurose Homepage (umass.edu)	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.