	Ministry of Higher Education and Scientific Research - Iraq University of Technology Department of Computer Science Networks Management Branch	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**COMMUNICATION**		**Module Delivery**	
Module Type	BASIC		**-Theory Lecture** **-Lab** **-PracticalSeminar**	
Module Code	**COMM214**			
ECTS Credits	**8**			
SWL (hr/sem)	**200**			
Module Level	2	**Semester of Delivery**	1	
Administering Department	Department of Computer Science	**College**	Computer Science	
Module Leader	Dr. Saeed R. Saeed	**e-mail**	saeed.r.saeed@uotechnology.edu.iq	
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**PhD.**	
Module Tutor	None	**e-mail**	None	
Peer Reviewer Name		**e-mail**		
Review Committee Approval		**Version Number**		

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	**Network**	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. **Understanding Data Transmission**: Familiarize students with the fundamental principles of data communication, including how data is transmitted over various media. 2. **Network Fundamentals**: Teach the basics of networking concepts, including types of networks (LAN, WAN), network topologies, and protocols. 3. **Data Encoding and Modulation**: Explore different methods of data encoding and modulation techniques used for effective data transmission. 4. **Communication Protocols**: Introduce students to key communication protocols (e.g., TCP/IP, HTTP) and their roles in data exchange. 5. **Network Security**: Raise awareness about security challenges in data communication and the importance of secure communication practices. 6. **Error Detection and Correction**: Understand techniques for detecting and correcting errors in data transmission to ensure data integrity. 7. **Wireless Communication**: Examine the principles and technologies behind wireless data communication, including Wi-Fi, Bluetooth, and cellular networks. 8. **Data Compression**: Learn about data compression techniques to optimize data transmission and storage. 9. **Hands-on Experience**: Provide practical experience with tools and technologies used in data communication, including network configuration and troubleshooting. 10. **Real-World Applications**: Discuss the applications of data communication in various fields, such as business, healthcare, and telecommunications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Conceptual Understanding**: Demonstrate a clear understanding of the fundamental concepts and principles of data communication, including data transmission and network architecture. 2. **Network Configuration**: Configure and troubleshoot basic network setups, including wired and wireless networks, using appropriate tools and techniques. 3. **Protocol Knowledge**: Identify and explain key communication protocols (e.g., TCP/IP, UDP, HTTP) and their roles in data exchange. 4. **Error Management**: Apply error detection and correction techniques to ensure data integrity during transmission. 5. **Security Awareness**: Recognize potential security threats in data communication and implement basic security measures to protect data. 6. **Encoding and Modulation**: Describe various data encoding and modulation techniques and their impact on transmission efficiency and quality. 7. **Data Compression Techniques**: Explain and apply data compression methods to optimize data transmission and storage. 8. **Wireless Communication Proficiency**: Understand the principles of wireless communication technologies and demonstrate the ability to set up and manage wireless networks. 9. **Real-World Application**: Analyze real-world scenarios to identify appropriate data communication solutions and technologies in different contexts.

Indicative Contents المحتويات الإرشادية	1. **Introduction to Data Communication** Definitions and key concepts Importance and applications of data communication 2. **Fundamentals of Networking** Types of networks (LAN, WAN, MAN) Network topologies (star, bus, ring, mesh) Basic networking devices (routers, switches, hubs) 3. **Data Transmission Basics** Analog vs. digital signals Transmission media (copper, fiber optic, wireless) Bandwidth and data rate 4. **Communication Protocols** Overview of OSI and TCP/IP models Key protocols (TCP, UDP, IP, HTTP, FTP, etc.) Role of protocols in data communication 5. **Encoding and Modulation Techniques** Data encoding methods (ASCII, Unicode) Modulation techniques (AM, FM, QAM) Impact on transmission quality 6. **Error Detection and Correction** Types of errors in data transmission Techniques for error detection (parity bits, checksums) Error correction methods (Hamming code, Reed-Solomon) 7. **Network Security** Common security threats (malware, phishing, DDoS) Basic security measures (encryption, firewalls) Introduction to secure communication protocols (SSL/TLS) 8. **Wireless Communication Technologies** Basics of wireless communication (Wi-Fi, Bluetooth, cellular) Standards and protocols (IEEE 802.11, GSM, LTE) Challenges and considerations in wireless communication

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	5	LO # 1 and 3
	Practical Seminar(Lab)	2	15% (15)	Continuous	LO # 2 , 4 and 5
Summative assessment	**Midterm Exam**	1 hr	15% (15)	14	LO # 1 to 5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	➢ Introduction • Data and signals • Analog and digital signals • Time and frequency domain
Week 2	• Composite signals • Bandwidth: bit rate, bit length, Baseband and broadband transmission
Week 3	• Attenuation, distortion, Noise, Types of noise, White Noise, Addition of Noise due to several sources • Signal to Noise Ratio Shannon capacity, throughput, delay, Jitter, Bandwidth delay product.
Week 4	➢ Data communication concepts • Data transmission • Parallel and serial transmission
Week 5	• Synchronous, and Asynchronous transmission • Modem definition
Week 6	➢ DIGITAL MODULATION AND MULTIPLEXING • Baseband Transmission • Passband Transmission
Week 7	➢ Frequency Division Multiplexing
Week 8	➢ Time Division Multiplexing
Week 9	➢ Code Division Multiplexing

Week 10	➢ Switching techniques- Circuit, packet and hybrid switching
Week 11	➢ Communication Error • Types of error
Week 12	• single bit error • burst error
Week 13	• Error detection • Vertical redundancy check
Week 14	• cyclic redundancy check • Error correction
Week 15	**Mid Term Exam and Preparatory Week**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction
Week 2	Amplitude Modulation.
Week 3	FM Modulation, Demodulation AND BESSEL ZEROS.
Week 4	PRBS generation, Noisy Channel Model and Eye Diagrams.
Week 5	Quizzes
Week 6	BPSK - Binary Phase Shift Keying
Week 7	CDMA - INTRODUCTION
Week 8	CDMA 1
Week 9	CDMA 2
Week 10	OFDM
Week 11	SDR 1
Week 12	SDR 2
Week 13	exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	Behrouz A. Forouzan, "Data Communications and Networking", McGraw Hill; 5th edition 2012.	No
Recommended Texts	Andrew S. Tanenbaum, "Computer Networks", Pearson, 5th Edition 2011	No
Websites		

APPENDIX

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.