MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Information Technology		**Module Delivery**	
Module Type	Secondary		☒ **Theory**	
Module Code	WBM-21-04		☒ **Lecture**	
ECTS Credits	8		☒ **Lab**	
SWL (hr/sem)	125		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1	**Semester of Delivery**		1
Administering Department	BME.	**College**	ENG.	
Module Leader	Ali Abdul-Hussein Mohammed	**e-mail**	ali.masaoodi@uowa.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**		M.S.c
Module Tutor	Ali Abdul-Hussein Mohammed	**e-mail**	ali.masaoodi@uowa.edu.iq	
Peer Reviewer Name	Non	**e-mail**	…	
Scientific Committee Approval Date	2025/9/16	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aims of this module are to introduce students to the foundational principles and practices of IT in contemporary society. The course enables learners to understand essential components such as computer hardware, software, data processing, networking, cybersecurity, programming, cloud computing, and bioinformatics. The module also emphasizes the ethical, social, and global implications of IT. It aims to develop students' analytical, technical, and problem-solving skills, preparing them to apply IT effectively in academic, personal, and professional contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students will be able to: 1. Understand the key concepts of IT including hardware, software, networking, and databases. 2. Apply programming and algorithmic thinking to solve basic problems. 3. Demonstrate knowledge of cybersecurity threats and solutions. 4. Utilize multimedia tools and data formats for digital content processing. 5. Explore cloud computing and internet-based applications. 6. Understand bioinformatics fundamentals and data retrieval techniques. 7. Analyze ethical and social issues associated with information technology. 8. Develop practical skills in using modern IT tools and platforms.
Indicative Contents المحتويات الإرشادية	1. Introduction to IT and its impact in various sectors 2. Computer hardware and software fundamentals 3. Data representation, storage, and processing 4. Multimedia technologies: text, audio, image, video, animation 5. Networking, internet, and cloud computing 6. Cybersecurity principles and global data protection 7. Algorithmic thinking and programming basics 8. Database concepts and file management 9. Internet applications, APIs, and cloud services 10. Bioinformatics: biological data formats, analysis, and tools

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this module by encouraging students to participate in discussions, while improving and expanding their critical thinking skills. This will be achieved through discussions during the weekly lectures and after the oral presentations by answering the questions of their colleagues. Enhancing the principle of teamwork by participating in the implementation of the laboratory Assignments and developing the student skills in programming using Python by implementing challenged project assignments.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4,10	LO #1,2,3,4 and 9
	Project Assignment	1	10% (10)	12	All
	Lab. Assignment	1	10% (10)	Continuous	All
	Seminar	1	10% (10)	The student chooses the week and the topics	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Information Technology:** • Definition and scope of IT in the digital age • History and evolution of computing and IT systems • Types of computers: microcomputers, mainframes, supercomputers, mobile devices • IT in education, healthcare, government, and business • The digital divide: global inequality in access and usage • Social, cultural, and economic impacts of IT
Week 2	**Computer Hardware and Software:** • Components of a computer system: input, output, storage, processing • Brief introduction on CPU architecture, control unit, ALU, registers • RAM, ROM, and cache memory • Storage technologies: HDDs, SSDs, flash memory, optical storage
Week 3	• System vs application software • File types, formats, and extensions • Operating system basics: process management, user interfaces, multitasking
Week 4	**Data Representation and Processing** • Number systems: binary, decimal, hexadecimal • Character encoding standards: ASCII, Unicode • Binary representation of Image, audio, and video. Data compression: lossless vs. lossy • Data integrity and error checking • Input-process-output (IPO) model, Data types and data formats
Week 5	**Multimedia: Video, Audio & Animation** • Text encoding, UTF-8, plain text, richtext, hypertext, text compression, text as UI element, glyphs, TrueType (TTF), font rendering, anti-aliasing, text editors. • Digital audio, sampling rate, quantization, bit depth, compression (MP3, WAV), audio processing (trimming, effects, mixing) • Digital images and graphics, resolution, bit depth, Bitmaps (JPEG, PNG, GIF), image compression, vector graphics (SVG, AI), color model RGB, • Video principles, frames, formats, editing, compression, encoding, 2D animation.
Week 6	**Networking, Internet, and Cloud Computing** • Network types: LAN, WAN, MAN, PAN • Network topologies: star, bus, ring, mesh • Communication protocols: TCP/IP, HTTP, FTP • IP addressing, DNS, MAC addresses • Internet architecture and services: WWW, email, VoIP, DNS • Cloud computing: SaaS, PaaS, IaaS • Multimedia delivery over the internet: streaming protocols, buffering, latency

Week 7	**Midterm Exam**
Week 8	**Cybersecurity Introduction** • Cyber threats: malware, ransomware, phishing, DoS/DDoS attacks • Encryption and authentication methods • Password management and two-factor authentication • Ethical issues: data privacy, surveillance, algorithmic bias • Intellectual property, copyright, software piracy • Digital forensics and cybercrime law • GDPR and global data protection regulations
Week 9	**Algorithms Principles** • Problem decomposition and abstraction • Algorithm design principles • Flowcharting symbols, Pseudocode and structured logic • Sorting and searching algorithms • Complexity: time and space considerations
Week 10	**Programming Fundamentals** • Introduction to programming languages • Data types, variables, and expressions • Brief introduction into control structures: if-else, loops, switch-case • Functions, procedures, and modular programming • Arrays and data collections • GUI vs command-line applications • IDEs and version control systems (Git)
Week 11	**Database & File Management** • Concepts of databases: tables, fields, records, keys • Database models: relational, hierarchical, object-oriented • SQL fundamentals: SELECT, INSERT, UPDATE, DELETE, JOIN • Data validation and integrity • File organization: sequential, indexed, hashed • Flat files vs. relational databases • Biological Databases and Data Retrieval, overview of biological databases
Week 12	**Internet Applications and Cloud Services** • Static vs. dynamic web pages • Front-end frameworks, • Role of the back end: APIs, databases, authentication • RESTful APIs and HTTP methods • Introduction to back-end frameworks, Intro to XML and JSON
Week 13	• Introduction for cloud computing, cloud benefits • Characteristics: on-demand, scalability, multitenancy, elasticity • Service models • Cloud providers: AWS, Azure, GCP overview

	• Internet of Things (IoT) and Cloud Integration • Data collection and streaming • Real-time analytics and dashboards • Smart devices and cloud-based control
Week 14	**Bioinformatics & Computational Biology** • Central dogma of molecular biology • DNA, RNA, protein structures and sequences • Biological databases: NCBI, GenBank, UniProt, PDB • Sequence retrieval and data formats (FASTA, GFF) • Comparative genomics and genome browsers • Sequence annotation and metadata
Week 15	• DNA sequence manipulation with Python • Protein translation & reading frames, translate DNA/RNA sequences into proteins and explore different reading frames. • Fundamentals of sequence alignment • Building basic bioinformatics workflows: integrating python and conceptual tools for simple data analysis and visualization.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Brian K. Williams_ Stacey C. Sawyer - Using information technology, a practical introduction to computers communications	Yes
Recommended Texts	Wang, Xinkun. Next-generation sequencing data analysis. CRC Press, 2023.	No
Recommended Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	**A** - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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.