Level Three (UGIII) Semester Five

Module Descriptor Form
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Artificial Intelligence			**Module Delivery**	
Module Type	Core			☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC35119				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	**Semester of Delivery**		5
Administering Department		CS	**College**		
Module Leader	Rawaa Dawoud Hassan		**e-mail**	rawaa.hassan@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		PhD.
Module Tutor	Rafal Ali Sameer		**e-mail**	rafal.a@sc.uobaghdad.edu.iq	
Module Tutor	Ahmed Hashim		**e-mail**	ahmedhashem@pgiafs.uobaghdad.edu.iq	
Peer Reviewer Name		Fatin Sadeq	**e-mail**	fatin.alkinani@sc.uobaghdad.edu.iq	
Review Committee Approval		6/8/2025	**Version Number**		1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC12006, CSC24115, CSC24116	**Semester**	2,4
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 AI are: 1. Read human behavior to develop intelligent machines. Simply put, the foundational goal of AI is to design a technology that enables computer systems to work intelligently independently. 2. Developing efficient problem-solving algorithms that can make logical deductions and simulate human reasoning while solving complex problem. 3. AI systems offer methods to deal with uncertain situations or handle the incomplete information conundrum by employing probability theory, such as a stock market prediction system. 4. Learning is fundamental to AI solutions. Conceptually, learning implies the ability of computer algorithms to improve the knowledge of an AI program through observations and past experiences. Technically, AI programs process a collection of input-output pairs for a defined function and use the results to predict outcomes for new inputs. 5. Intelligent agents must be able to set goals and achieve them. They need a way to envision the future - a representation of the state of the world and make predictions about how their actions will change it - and be able to make choices that maximize the utility of the options available. 6. A sub-field of AI addresses creativity theoretically (philosophical, psychological perspective) and practically (the specific implementation of systems that produce novel and useful outputs). Some related areas of computational research include artificial intuition and artificial thinking.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To develop a solid understanding of fundamental concepts, theories, and techniques in artificial intelligence, including machine learning, natural language processing, computer vision, and knowledge representation. 2. To apply AI algorithms and techniques to solve real-world problems by designing and implementing appropriate algorithms, analyzing their efficiency and effectiveness, and making informed decisions about algorithm selection. 3. To acquire practical programming skills in AI-related languages (e.g., Python) to implement and evaluate AI models and systems. 4. To understand the ethical implications of AI technologies, including issues related to privacy, bias, transparency, and fairness. Develop awareness of societal impacts and the responsible use of AI. 5. With better monitoring and diagnostic capabilities, artificial intelligence can dramatically influence healthcare. 6. Design and evaluate conversational interfaces for different users and contexts of use. 7. Design AI frameworks and structures to integrate robotic process automation (RPA) in business process management systems (BPMS).
Indicative Contents المحتويات الإرشادية	Inductive content include the following: Robotic vehicles, Speech recognition, Autonomous planning and scheduling, Game playing, Spam fighting, Logistics planning, Robotics, Machine Translation, are some of examples about what can AI do today. A programmer must be able to analyze and predict their behavior structures and strategies for State Space Search where graph theory is the best tool for reasoning about the structure of objects and relations [10 hrs]. Study the state space representation of tic-tac-toe, 8-puzzle, and the traveling

	salesperson. Depth-first search, breadth-first, and Depth-first iterative deepening search strategies (or Graph Search Algorithms) are the first search algorithms [10 hrs]. Study the Best-First Search Algorithm and Best-First Search Algorithm with cost (Algorithm A). Evaluate the performance of several different heuristics for solving games with multiple playing strategies (8-puzzle board and Tic-tac-toe board) [15 hrs]. Heuristics are the main component of the algorithm i.e., the brain of the algorithm without it the algorithm is not intelligent. Heuristics give boundaries to the algorithm, as in which not to select and which to select. Heuristics give the general estimate of the distance to goal node helping the algorithm to choose the optimal node in the next step [15 hrs]. The game nim used to examine Minimax procedure searches strategy. Straight minimax requires a two-pass analysis of the search space, the first to descend to the ply depth and there apply the heuristic and the second to propagate values back up the tree. Minimax pursues all branches in the space, including many that could be ignored or pruned by a more intelligent algorithm. Researchers in game playing developed a class of search techniques called alpha-beta pruning [10 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Here are some learning and teaching strategies that can be employed in an AI course: 1. Lectures: Traditional lectures can be used to introduce foundational concepts, theories, and algorithms in AI. Lectures can incorporate visual aids, examples, and case studies to enhance understanding. 2. Practical Coding Assignments: Assigning coding assignments that involve implementing AI algorithms and techniques allows students to gain hands-on experience. They can work with programming languages such as Python. 3. Group Projects: Encouraging students to work in groups on AI projects promotes collaboration, problem-solving, and teamwork. Projects can involve tasks like developing a chatbot, building a recommendation system, or designing an image recognition system. 4. Case Studies: Analyzing real-world case studies that demonstrate the application of AI techniques in various domains (e.g., healthcare, finance, or transportation) helps students understand practical challenges and ethical considerations. 5. Guest Speakers: Inviting guest speakers from industry or academia who specialize in AI can provide insights into real-world applications, research advancements, and emerging trends. They can share their experiences and inspire students. 6. AI Demos and Workshops: Organizing demonstrations and hands-on workshops with AI tools and technologies allows students to explore AI applications and experiment with cutting-edge tools such as natural language processing or computer vision. 7. Interactive Discussions: Facilitating class discussions on AI-related topics, ethical considerations, and societal impacts encourages critical thinking and helps students develop their perspectives on AI-related

	issues. 8. Online Resources and Tutorials: Curating a list of online resources, including tutorials, research papers, and educational websites, provides additional learning materials for students to deepen their understanding and explore AI topics of interest. 9. Assessments and Examinations: Using a mix of assessments, such as quizzes, exams, coding assignments, and project presentations, allows students to demonstrate their understanding of AI concepts and their ability to apply them. 10. Ethical Debates: Incorporating ethical debates and discussions into the curriculum helps students explore the ethical implications of AI technologies and develop a broader perspective on the responsible use of AI. These strategies aim to engage students actively, promote practical application and critical thinking, and provide a well-rounded educational experience in the field of AI. The specific strategies employed may vary based on the course objectives, level of study, and available resources.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (5)	5 and 10	
	Assignments	2	5% (5)	2 and 12	
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	10	
Summative assessment	**Midterm Exam**	2 hr	20% (10)	7	
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	1. Artificial Intelligence Definitions and Applications
Week 2	2. Graph Theory
Week 3	3. The state space representation of problems a) Example (1): TIC-TAC-TOE
Week 4	b) Example (2): THE 8-PUZZLE c) Example (3): TRAVELLING SALESMAN PROBLEM
Week 5	4. Strategies for State Space Search (or Graph Search Algorithms)
Week 6	5. Blind (systematic) search algorithms a) Depth-First search
Week 7	b) Breadth-First search
Week 8	a) Iterative Deepening Depth-First Search
Week 9	6. Heuristic (non-systematic) search b) Best-First search (without cost)
Week 10	a) Best-First search with cost (A algorithm)
Week 11	7. Heuristics in Games a) 8-Puzzle board
Week 12	b. Tic-Tac-Toe board
Week 13	8. Analysis of heuristics a. Admissible heuristic b. Consistent heuristic c. Informedness in heuristics
Week 14	9. The MiniMax Procedure on Exhaustively Searchable Graphs
Week 15	10. The Alpha-Beta Pruning
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: 1. Download and Installation 8. What is PROLOG? 9. Facts, Rules, and Queries 10. Logical operators 11. What is a predicate in PROLOG? 12. Objects and comments 13. Exercises
Week 2	Lab 2: 1. Debugging 2. Non-Graphical Debugger 3. Graphical Debugger 4. Which tool is best? 5. The cut (!) statement. 6. Exercises
Week 3	Lab 3: 1. Arithmetic operations 2. Recursion & Backtracking 3. Graph representation 4. Exercises
Week 4	Lab 4: 1. What is a list 2. Extracting Information 3. Recursion with Lists 4. Exercises
Week 5	Lab 5: 1. Problems and brainstorming 2. Search with lists 3. Exercises
Week 6	Lab 6: 1. Built-in functions (bagof, findall and setof) 2. Negation in PROLOG 3. Comparison operators 4. Modal dialog: promoting for answer 5. Exercises.
Week 7	Lab 7: Python 1. Introduction. 2. Python compiler installation 3. Python file execution 4. Pip installation 5. Python IDE (Spyder) 6. Math operators 7. Data types 8. Variables 9. Comments 10. Build-in functions (print(), input(), len(), str(), int(), and float()) 11.

Week 8	Lab 8: 1. Flow control. 2. Boolean evaluation. 3. Function. 4. Exception Handling.
Week 9	Lab 9: 1. Lists 2. Dictionaries 3. Sets
Week 10	Lab 10: Search Algorithms 1. Blind Search: Depth-first search algorithm (PROLOG) 2. Blind Search: Depth-first search algorithm (Python)
Week 11	Lab 11: Search Algorithms 3. Blind Search: Breadth-first search algorithm (PROLOG) 4. Blind Search: Breadth -first search algorithm (Python)
Week 12	Lab 12: Search Algorithms 1. Heuristic Search: Best-First Search algorithm (PROLOG) 2. Heuristic Search: Best-First Search algorithm (Python)
Week 13	Lab 13: Search Algorithms 1. Heuristic Search: A* algorithm (PROLOG) 2. Heuristic Search: A* algorithm (Python)).
Week 14	Lab 15: Games 1. Tic-tac-toe 2. 8-Puzzle
Week 15	Lab 16: Games 3. Traveling salesman problem 4. Projects
Week 16	Preparatory Week before the Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	[Luger] Luger, George F. (2009) Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th edition. Boston: Addison-Wesley Pearson Education. [Russell and Norvig] Russell, Stuart J. and Norvig, Peter (2010) Artificial Intelligence: A Modern Approach, 3rd edition, Prentice Hall.	Yes
Recommended Texts	[Poole and Mackworth] Poole, David and Mackworth, Alan (2017) Artificial Intelligence: Foundations of Computational Agents, 2nd edition, Cambridge University Press.	No
Websites		

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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	COMPUTER NETWORKS			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC35120				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Adnan J. Jabir		**e-mail**	Adnan.jabir@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC11002, CSC23110	**Semester**	1,3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this module is to help the students understand the main concepts of computer networks related to standards, techniques and protocols that govern computer communications. The course will cover the theoretical and practical implementation of connecting computers using suitable CISCO configuration and network devices in LAB. Also the students will recognize different computer networks devices and their specifications that are available in the market.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define computer networks and its uses and devices in real life. 2. Recognize computer networks communication concepts and criteria. . 3. Describe the basis and structure of an abstract layered protocol model. 4. Apply reliable connection in computer networks. 5. Digital transmission for computer networks and transmission media in communication. 6. Design and configure computer networks. 7. Virtual LANs using CISCO switch devices. 8. IP Addressing for computers. 9. Class Addressing. 10. Classless Addressing. 11. Subnetting. 12. Subnetting for computer network design. 13. Data link layer functions. 14. Error detection for transmitted packets.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module are: 1. Powerpoint presentation (Data show and Videos lectures). 2. Explanation on the white board using different color markers. 3. Discussions with the student during teaching and online hangout meetings. 4. Interaction with students through daily problems and exercises through lectures. 5. Use CISCO devices in LAB to design computer networks in addition to simulator software. 6. Solve different problems with more exercises that develop critical thinking for students. 7. Submit assignments that develop student learning. 8. Prepare reports about modern technologies to keep up to date with market and industry.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	(1), (2), (3) (5, 6, 8)
	Assignments	2	10% (10)	6 and 12	(1), (2), (3), (4), (5),(6) (8), (9), (10), (11), (12), (13), (14)
	Projects / Lab.	1	10% (10)	Continuous	(1)- (14)
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	(1)- (6)
	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 Data Communication and Computer Networks, Network device, Networks types, and Network topologies.
Week 2	Protocol layering OSI Model and TCP/IP models.
Week 3	Physical layer: encoding, signaling, communication media types, cables types and categories, network devices for layer 1. Ethernet principles.
Week 4	Data link layer: framing, media access control technologies CSMA/CD, CSMA/CD, Physical Addressing MAC, Ethernet at datalink layer, ARP, Layer 2 devices switches and bridges, collision and broadcast domains.

Week 5	Network layer: purpose and functions, protocols, IPv4 format IPv4 addressing, IPv4 classes.
Week 6	Sub-netting: Classless addressing and CIDR Notation VLSM: Variable length subnet mask
Week 7	Mid-Term Exam
Week 8	Transport layer: purpose and function, protocols, TCP and UDP, protocols format, port addressing, flow control, error control, congestion control, three way hand shaking.
Week 9	Routing and Switching
Week 10	Static routing and default route
Week 11	Distance vector routing protocols
Week 12	Link-state routing protocols
Week 13	IPv6 protocol, header format, features of IPv6
Week 14	IPv6 addressing, unicast, anycast and multicast
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction: Network components, Network devices (routers and switches), Physical network types (Ethernet and Wi-Fi), Ethernet cabling, Internetworking, protocol
Week 2	IP address config.: Planning the IP addresses, subnet mask and gateway for Internetwork, differences between static and dynamic IP address configuration, DHCP server, ipconfig ipconfig/release ipconfig/ renew commands
Week 3	IP connectivity: Check the IP connectivity between two hosts in the network, request/response, source/destination, ICMP, ping and tracert commands
Week 4	ARP: MAC address, differences between MAC and IP address, ARP table, arp –a arp –s arp –d commands
Week 5	DNS: Domain name resolution, DNS lookup, DNS cache, nslookup ipconfig/displaydns ipconfig/flushdns commands
Week 6	TCP vs UDP: Differences and similarities between TCP and UDP, port number, TCP connection, netstat command
Week 7	WLAN: Band and channel, unlicensed frequencies (2.4 and 5 GHz), AP configuration, WLAN security
Weak 8	Device Management: Inband vs out-of-band management, Cisco IOS modes and features
Weak 9	Router IP config.: Enabling and assigning IP addresses to the router interfaces Configure the router as DHCP server, DHCP pool configuration
Weak 10	Static routing: Routing fundamentals, routing table, AD vs metric, static routing, default routing
Weak 11	Dynamic routing : Static vs dynamic routing, routing protocol, distance vector routing protocol, RIP configuration Link-state routing protocol, neighbor table, LSDB, loopback interface, OSPF configuration
Weak 12	VLAN: Advantages of VLAN, VLAN membership, access vs trunk ports, 802.1Q encapsulation, VLAN configuration Different routing methods for VLAN, Router-on-Stick configuration, ML switch

	configuration
Weak 13	NAT: Public vs private IP addresses, advantages of NAT, NAT types, source vs destination NAT
Weak 14	IPv6: Purposes of IPv6, IPv6 vs IPv4, different types of IPv6 addresses, IPv6 auto-configuration, basic IPv6 configuration
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, 2013. 2. CCNA 200-301, Official Cert Guide, Volume 1, WENDELL ODOM, Cisco Press Inc., 2020	Yes
Recommended Texts	Douglas E. Comer, Computer networks and Internets, 6th Edition, 2015	No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Security			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
CSC36135	CSC35121				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3	**Semester of Delivery**	5		
Administering Department	CS	**College**	Science		
Module Leader	Sarab M. Hameed	**e-mail**	sarab.m@sc.uobaghdad.edu.iq		
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.		
Module Tutor					
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	6/8/2025	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC11002	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Upon successful completion of this course, the student will: 1. Be able to define key security concepts and principles. 2. Understand various authentication methods, such as passwords, biometrics, and multi-factor authentication. 3. Implement access control mechanisms to restrict unauthorized access. 4. Understand why networked computers have their particular vulnerabilities and how to mitigate exposure. 5. Understand firewalls and intrusion detection/prevention systems 6. Understand secure network design principles. 7. Be familiar with non-technical issues like privacy, ethics, and legal aspects of security.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The expected learning outcomes of the course are as follows: 1. Acquiring a comprehensive understanding of computer and network security. 2. Learning how to implement effective security measures to prevent threats from compromising systems and networks. 3. Applying various means of user authentication and their common use cases. 4. Following best practices to avoid malicious software 5. Applying firewall policies that restrict the flow of network traffic to protect a host or network. 6. Gaining knowledge about how to protect programs and data, the laws related to computer crimes and the legal process involved in such cases, and the specific characteristics of digital objects.
Indicative Contents المحتويات الإرشادية	**Part A: (15 hrs)** Part A of the course covers the fundamental concepts of security, including assets, threats, vulnerabilities, controls, confidentiality, integrity, availability, attackers, and attack types. It also covers network concepts, authentication mechanisms such as password, biometric, and multi-factor authentication, access control principles and policies, access control models, types of malicious software, and how to secure access using AAA. **Part B: (15 hrs)** Part B of the course focuses on firewalls, including the types of firewalls and different firewall strategies. It also covers the role of a detector, the differences between an IDS and an IPS, types of IPS, and modes of detecting malicious traffic. Additionally, the course discusses the types of attacks on Layer and the best security practices for protecting Layer. Network security protocols in practice and legal issues and ethics are also covered in this part of the course.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Delivering lectures to introduce and explain essential concepts, principles, and theories related to data structures. This helps students build a strong foundation of knowledge. 2. Encouraging group projects and activities among students. This promotes teamwork and enhances understanding. 3. Regular evaluations and examinations help gauge students' understanding and progress. These can include quizzes, assignments, and exams that assess theoretical knowledge and practical application of data structures. 4. Enabling interactive conversations on computer and network security and exploring the latest developments in this domain. 5. Recommending textbooks, internet resources, and supplementary references might help students study more effectively.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	3 and 10	LO #3, #4 and #6, #7
	Projects / Lab.	1	15% (15)	14	All
	Report	5	5% (5)	10	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Security concepts** • Assets, threats, vulnerabilities, controls, confidentiality, integrity, availability, attackers, and attack types.
Week 2	**Network concepts**
Week 3	**Authentication** • Password • biometric • Multi-factor authentication
Week 4	**Access Control** • Access control principles • Access control policies • Access control models
Week 5	**Malicious Software**
Week 6	**Securing Access Using AAA**
Week 7	Exam
Week 8	**Firewalls** • Introducing firewalls • Types of firewalls • Different firewall strategies
Week 9	**Intrusion Prevention System (IPS)** • the role played by a detector • differences between an IDS and an IPS • types of IPS - host-based IPS - network-based IPS • modes of using an IPS • types of alarms
Week 10	• modes of detecting malicious traffic • severity levels of signatures • monitoring and management of alarms and alerts
Week 11	**Securing a Local Network** • Types of attacks on Layer 2 • The best security practices for protecting Layer
Week 12	**Network Security Protocols in Practice**
Week 13	**Legal Issues and Ethics** • Protecting programs and data • Computer crime statutes and the legal process • Unique characteristics of digital objects • Ethics: principles and situations to explore
Week 14	Final Project Presentation
Week 15	A preparatory week before the Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	1. A. Sadiqu, Computer Network Security, Wiley-ISTE, 2020. 2. J. Wang Z. A. Kissel, Introduction to Network Security Theory and Practice, 2nd Edition, John Wiley & Sons Singapore, 2019. 3. Charles Pfleeger, Shari Lawrence Pfleeger, Lizzie Coles-Kemp, Security in Computing, 6th Edition, Addison-Wesley Professional, 2023.	No
Websites		

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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	WEB APPLICATION DEVELOPMENT			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC35122				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	CSC		**College**	Type College Code	
Module Leader	Maysa Ibrahem Abdulhussain		**e-mail**	Maysaa.i@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Web design (CSC24018)	**Semester**	4
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamentals of web application development: The module should provide an introduction to the basics of web application development, including client-side and server-side technologies, web protocols, and web development frameworks. 2. Learn HTML, CSS, and PHP: Students should acquire the skills necessary to create the structure, style, and behavior of web pages using HTML for markup, CSS for styling, and PHP for client-side interactivity.

	3. Explore server-side programming languages: The module should cover server-side programming languages like C#, PHP. 4. Understand web development frameworks: Students should be introduced to popular web development frameworks such as XAMP 5. Database integration: The module should cover the integration of web applications with databases. Students should learn how to connect to databases, (Create, Read, Update, Delete), and handle data validation and security. 6. Implement user authentication and authorization: Students should understand the concepts of user authentication and authorization and learn how to implement them in web applications. This includes managing user sessions, user roles, and implementing secure login and registration processes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Building Interactive Web Pages: Students should be able to design and create interactive web pages using HTML, CSS, and PHP. They should be able to incorporate user input, handle events, and dynamically manipulate web page elements. 2. Backend Development: Students should be familiar with server-side programming languages such as Python, PHP, or Node.js. They should be able to develop server-side code to handle requests, interact with databases, and perform server-side processing. 3. Database Integration: Students should understand how to integrate databases into web applications. They should be able to design and create database schemas, perform basic CRUD (Create, Read, Update, Delete) operations, and handle data validation and security. 4. Web Application Frameworks: Students should be introduced to popular web application frameworks 5. Responsive Web Design: Students should understand the principles of responsive web design and be able to create web applications that adapt and display properly across different devices and screen sizes. 6. Web Services and APIs: Students should be introduced to the concept of web services and application programming interfaces (APIs).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Bottom of Form Indicative content for web application development can include various components and topics that are essential for building a web application. Here are some indicative content areas: 1)Introduction to Web Application Development:(15hr) Overview of web application development Client-server architecture Basics of web technologies (HTML, CSS, JavaScript) 2)Back-end Development:(15 hr) Server-side programming languages (e.g. PHP) Database integration and management (e.g., SQL, MongoDB)

	Web frameworks and libraries (e.g., Django, Laravel, Express) 3)APIs and Data Integration (15hr) RESTful APIs and API design principles Consuming and integrating third-party APIs Data formats (e.g., JSON, XML) and data handling techniques 4)Testing and Debugging: (15hr) Unit testing and test-driven development (TDD) Debugging techniques and tools Cross-browser and cross-platform compatibility testing 4)Deployment and Hosting: (15hr) Web hosting options and considerations Continuous integration and deployment (CI/CD) pipelines Cloud platforms and server configuration 5)Performance Optimization: (15hr) Website performance metrics and optimization strategies Caching techniques and content delivery networks (CDNs) 6)Project Management and Version Control(15 hr)

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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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**	3	5% (5)	3,5 and 10	All
	Assignments	2	5% (5)	2 and 12	All
	Projects / Lab.	1	15% (15)	Continuous	All
	Report	1	5% (5)	13	All
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	All
	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 PHP Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.
Week 2	Variables, Data Types, and Operators Declaring and using variables in PHP Different data types in PHP (e.g., strings, integers, floats, booleans) Operators for mathematical, logical, and comparison operations
	Decisions and loop Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.
Week 3	Function What is a function, Define a function, Call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function
Week 4	Array Anatomy of an Array, Creating index based and Associative array Accessing array, Element Looping with Index based array, Looping with associative array using each () and foreach(), Some useful Library function.

Week 5	Handling Html Form with Php Capturing Form, Data Dealing with Multi-value filed.
Week 6	Handling Html Form with Php Generating File uploaded form, redirecting a form after submission.
Week 7	Mid-term Exam
Week 8	Working with file and Directories Understanding file& directory, Opening and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading & Downloading.
Week 9	Session and Cookie Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.
Week 10	Database Connectivity with MySql Introduction to RDBMS, Connection with MySql Database, Performing basic database operation(DML) (
Week 11	Database Connectivity with MySql (Insert, Delete, Update, Select), Setting query parameter, Executing query- Join (Cross joins, Inner joins, Outer Joins, Self joins.)
Week 12	Second mid-term exam
Week 13	Exception Handling Understanding Exception and error, Try, catch, throw. Error tracking and debugging.
Week 14	PHP Forms and User Input Handling user input from HTML forms Using superglobal arrays (e.g., $_GET, $_POST) to access form data Validating and sanitizing user input
Week 15	Handling Errors and Exceptions Debugging techniques and tools in PHP Error handling mechanisms (e.g., error reporting, exception handling) Custom error and exception handling
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Basic PHP syntax
Week 2	Decisions and loops
Week 3	functions
Week 4	Arrays
Week 5	HTML forms & PHP
Week 6	Files and directories
Week 7	Sessions and Cookies
Week 8	MySQL database
Week 9	Exception handling
Week 10	Advanced features

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Learning PHP, MySQL, books by O riley Press	Yes
Recommended Texts	PHP and MySQL Web Development" by Luke Welling and Laura Thomson - This book covers the fundamentals of PHP and MySQL for web development, including database integration, form handling, security, and more. It provides practical examples and step-by-step tutorials. You can find it at https://www.phpandmysqlbook.com/.	No
Websites	"Learning PHP, MySQL & JavaScript" by Robin Nixon - This book is a comprehensive guide to web development using PHP, MySQL, and JavaScript. It covers the basics of each language and demonstrates how they can be used together to build dynamic web applications. More information can be found at http://www.learningphpmysqljavascript.com/.	

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
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	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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	SOFTWARE ENGINEERING			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC35123				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		3	**Semester of Delivery**		5
Administering Department		CSC	**College**		
Module Leader	1- Dr. Faten Abed Ali Dawood 2- Dr. Safaa Khalil Mortada		**e-mail**	faten.dawood@sc.uobaghdad.edu.iq safaa.alwajidi@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		6/8/2025	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC11003, CSC23110	**Semester**	1,3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To gain understanding of design, implementation and testing methods in the context of software engineering. 2. To help students have a broad understanding of software engineering applications by analyzing user requirements for designing and implementing the software product according to generally accepted standards. 3. To develop group working skills by understanding the labor market requirements and documenting large systems. 4. Helps student to develop and maintain software systems by identifying modern technologies. 5. To understand the role of project management. 6. Introduce state-of-the-art tools and techniques for large-scale software systems development. 7. Implement the major software development methods in practical projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Have knowledge about the importance of software systems and their applications in the labor market. 2. Understand the characteristics of the newly used models in software analysis and design. 3. Knowing how to obtain user requirements for the software system through field studies and labor market requirements. 4. Have knowledge of the initial phases of the software engineering lifecycle, i.e. requirements engineering, software design and be able to apply them in a large-scale industrial setting. 5. Knowing the use of modern technologies and methods to analyze user requirements through deduction and analysis skills to enable Students develop large software systems. 6. Have experience of a variety of aspects of software engineering through the development of a large piece of software within a group 7. Have experience of a variety of aspects of software engineering through the development of a large software system within a teamwork group.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A:</u> Students should be able to understand that producing software is an engineering task and that engineering disciplines are often applicable to it. They should also appreciate that producing software is more than just programming. a. Defining software [2 hrs] b. Software application domains [4 hrs] i. Systems software ii. Application software iii. Engineering/scientific software iv. Embedded software v. Artificial intelligence software

	Part B: Students should understand how models have brought useful structure to the discipline of software engineering, as well as how modern software is characterized by constant change, tight schedules and the need to meet users' expectations. They should also understand and be able to discuss both strengths and weaknesses of evolutionary process models, which were originally conceived to address these issues. a. Prescriptive models: i. Waterfall models, e.g. classic lifecycle or V model [4 hrs] ii. Incremental process models [2 hrs] iii. Evolutionary process models, e.g. prototyping or spiral model [4 hrs] iv. Concurrent models [2 hrs] b. Agile Software Development [4 hrs] Part C: Students are expected to be able to identify distinct sub disciplines of software engineering and to be able to identify their characteristics. a. Requirements analysis and specification [2 hrs] b. Software design and development [4 hrs] c. Software testing and maintenance [4 hrs] d. Project management [2 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this module is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through the following: - classroom and interactive educational programs by reflection on individual and team productive projects - Theoretical tests and Quizzes - Evaluate the homework and assignments required by discussing the reports submitted by the students - The theoretical midterm and final exams

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	5% (5)	3, 6 and 9	LO #1, #2, #3, #4, #5 and #6, #7, #8
	Assignments	2	10% (10)	3 and 12	LO #4, #5 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	5% (5)	14	LO #6, #9 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	10	LO #1 - #10
	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 Software Engineering
Week 2	Software process models – Part1(Waterfall , V-shaped and Evolutionary Prototyping)
Week 3	Software process models – Part2(Incremental development , Spiral model)
Week 4	Agile Software Development
Week 5	Scaling Agile Methods
Week 6	Requirements engineering process
Week 7	Functional & Non-Functional Requirements
Week 8	System modeling & Architecture design

Week 9	Software development (design and Implementation)
Week 10	Software Testing & Evaluation
Week 11	Software Management (Project scheduling & Agile planning)
Week 12	Object-Oriented design using UML
Week 13	Software Product lifecycle- Case study examples
Week 14	Team- Work Presentation – Part1
Week 15	Team- Work Presentation – Part2

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Software Engineering, 10th Edition by Ian Sommerville, 2016	No
Recommended Texts	1- Software Engineering: A Practitioner's Approach, 8th Edition by Roger S. Pressman, Bruce Maxim, 2015 2- Introduction to Software Engineering, 2nd Edition by Ronald J. Leach, 2016	No
Websites	https://www.tutorialspoint.com/software_engineering/index.htm	

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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	COMPUTER ARCHITECTURE			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	CSC35124				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		**Semester of Delivery**	5	
Administering Department	CSC		**College**	Type College Code	
Module Leader	Nahlah Abdulrahman Hussein		**e-mail**	nahlah.a@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Master	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC11002, CSC12007, CSC23110	**Semester**	1,2,3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the computer system and basic computer components. 2. To understand all physical aspects of computer systems e.g., circuit design, control signals, and memory types. 3. To understand the input/output organization and peripheral devices. 4. Understand interface as a shared boundary between two separate components of the computer system for communication purposes. 5. To understand computer memory as the storage space in the computer and learn its types. 6. To learn the concept of multicore, multiprocessor, and multiprogramming Systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the computer organization and its basic components. 2. Learn how the various computer components communicating with each other. 3. List and understand the various types of computer memory. 4. Arranging different kinds of storage present on a computing device based on the speed of access. 5. Summarize what is meant by a basic computer architecture. 6. Describe the mapping methods of data and instructions pulled from the RAM to cache memory. 7. Identify the basic concept of using multicore and multiprocessor computers and their impact on performance enhancement.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Computer Architecture Components</u> – Input / output organization, peripheral devices, input/output interfaces, programming input/output devices. [4 hrs] - I/O Programming Techniques – Programmed I/O, Interrupt Initiated I/O, interrupt vector table, Direct Memory Access, direct memory access controller. [6 hrs] Revision problem classes [2 hrs] <u>Part B – Memory System</u> - Memory definition, memory types, memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, cache mapping, fully associative mapping, direct mapping, set associative mapping. [8 hrs] - Instruction and data cache, types of instruction and data types, write techniques of instruction and data. [6 hrs] <u>Part C – Multicore, Multiprocessor, and Multiprogramming Systems.</u> - Introduction to multicore and multiprocessor systems, classification of multiprocessors by the way their memory is organized, multiprogramming system. {4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy that will be adopted in introducing this unit is to introduce operational units and their interrelationships that fulfill the architectural specifications of a digital computer system and make students aware of how data is processed, stored, and transmitted within a computer system. This is done by encouraging students to take advantage of the provided study materials by selecting and specifying the specifications of the devices they choose to build a computer system with good specifications and a reasonable cost.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2/ 1 hrs	10% (10)	3 and 5	LO #1, #2 and #6, #7
	Assignments	2	5% (10)	4 and 6	LO #3, #4 and #5,
	seminars	1	10% (10)	Continuous	All
	Report	1	5% (10)	10	LO #5, #6, and #7
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #4 - #5- #6 - #7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the computer architecture
Week 2	Programming I/O Devices techniques
Week 3	Programmed I/O technique
Week 4	Interrupt technique
Week 5	Direct Memory Access technique
Week 6	The 8259A Programmable Interrupt Controller
Week 7	- Memory system - Memory Hierarchy
Week 8	Associative Memory
Week 9	Cache Memory
Week 10	Cache Memory Organizations
Week 11	Fully associative mapping Direct mapping
Week 12	Set-associative mapping Fetch and write mechanism
Week 13	Multiprocessor system a. Tightly coupled b. Loosely coupled
Week 14	Multiprogramming system
Week 15	Multi-Core Architecture
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Computer Organization and Architecture Designing for Performance, tenth Edition William Stalling, Copyright © 2016, 2013, 2010 Pearson Education, Inc.	No
Recommended Texts	- Modern Computer Architecture and Organization Jim Ledin, Copyright Year: 2020 - Computer Architecture: Fundamentals and Principles of Computer Design. Joseph D. Dumas II · 2018	No
Websites	https://www.spiceworks.com/tech/tech-general/articles/what-is-computer-architecture/ https://www.javatpoint.com/computer-organization-and-architecture-tutorial	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	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.

Level Three (UGIII) Semester Six

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	MOBILE APPLICATIONS DEVELOPMENT			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC36125				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Alyaa Al-barrak		**e-mail**	E-mail: alyaa.al-barrak@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Salaw Aqeel Mahdi		**e-mail**	salwa.aqeel@sc.uobaghdad.edu.iq	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC23111	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding Mobile Devices: The course aims to help students gain knowledge about the various types of mobile devices, their operating systems, and how they function and develop applications. 2. Mobile Programming Concepts: Students are expected to learn and identify various concepts of mobile programming that make it unique from programming for other platforms. 3. Mobile Application Development Frameworks: Students will understand mobile application development frameworks, architecture, design, and engineering issues; techniques; and methodologies for mobile application development.

	4. User Interface Design: Students should be learning user-interface design for mobile applications. 5. Managing Application Data: Students can understand how to manage application data and database.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the Mobile Platform: Students should be gain a foundational understanding of the .Net Maui platform, which allows them to develop applications for Android using C# and the.NET framework. 2. Developing .Net Maui. Applications: Students could be able to build their .Net Maui. applications using Visual Studio and develop an understanding of the fundamentals of application development with .Net Maui. 3. Effective user interface: Students should be learnt to create useful apps with easy and creative interface 4. Database management student has been Learnt to develop apps that store and retrieve user information that persists beyond the life of the application. 5. Critically evaluate solutions to technical problems relating to mobile computing systems
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A –Mobile platform installation</u> Cross-platform projects with .Net Maui [2 hrs] Setting up the development environment and Emulator [2 hrs] Creating a cross-platform solution [2 hrs] <u>Part B – User Interface interaction</u> Adding UI behaviors and triggers [3hrs] Showing native pages with renderers [5hrs] Layouts / .Net Maui.Forms view elements [3hrs] Using styles and Creating behaviors[3hrs] <u>Part C – DB and pluins</u> SQLite data access[6 hrs] Creating cross-platform plugins [6 hrs] <u>Part D – XamChat for Android</u> The Android Manifest [4 hrs] Writing a login screen for XamChat [4 hrs] Android's ListView and BaseAdapter[4 hrs] Adding a friends list and a list of messages [4 hrs] <u>Part E- Project</u> Build Project [16 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A combination of lectures, tutorial and practical work will be used. Lectures will consider the latest developments in mobile technology covering topics for practical work and concepts, particularly for programming .Practical work will develop programming, user-interface design and configuration skills, building on individual worksheet-based assignments. Students use .Net Maui platform to write and execute assignments as well as a project to be submitted in the end of course

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	4,7,9	LO #4, #7,#9
	Assignments	5	10% (10)		LO #5, #7,#10,#12,#14
	Projects / Lab.	2	15% (10)	Continuous	All
	Report	1	5% (10)		LO #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	13	LO #1-12
	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 .NET MAUI
Week 2	Building Our First application
Week 3	The Fundamentals of .NET MAUI
Week 4	An Architecture to Suit You
Week 5	User Interface Essentials: Prerequisites, App Icons, and Splash Screen
Week 6	User Interface Essentials: XAML, and Layouts
Week 7	User Interface Essentials: Data Binding, and Shell.
Week 8	Creating Our Own Layout: Placeholder, ILayoutManager, and BoardLayout

Week 9	Creating Our Own Layout: FixedLayoutManager, and Using Your Layout
Week 10	Accessibility
Week 11	How to Make Your Application Accessible
Week 12	Testing Your Application's Accessibility and Accessibility Checklist
Week 13	Advanced UI Concepts : Adding the Ability to Add a Widget to a Board
Week 14	Advanced UI Concepts: Styling.
Week 15	Advanced UI Concepts: Triggers
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Review for C# language
Week 2	Installing visual studio and Maui
Week 3	Develop an application for Mobil
Week 4	Develop an application for Mobil
Week 5	Develop an application for Mobil
Week 6	Develop an application for Mobil
Week 7	Develop an application for Mobil
Week 8	Develop an application for Mobil
Week 9	Develop an application for Mobil
Week 10	Develop an application for Mobil
Week 11	Develop an application for Mobil
Week 12	Develop an application for Mobil
Week 13	Develop an application for Mobil
Week 14	Develop an application for Mobil
Week 15	Develop an application for Mobil

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introducing .NET MAUI: Build and Deploy Cross-platform Applications, Using C# and .NET, Multi-platform App UI	No
Recommended Texts	.NET MAUI for C# Developers: by Jesse Liberty, Rodrigo Juarez	No
Recommended Texts	.NET Multi-platform App UI documentation	
Websites	https://learn.microsoft.com/en-us/dotnet/maui/get-started/installation?view=net-maui-9.0&tabs=visual-studio	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Graphics			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC36126				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	**Semester of Delivery**		6
Administering Department		Computer Science	**College**	Science	
Module Leader	Husam Ali Abdulmohsin		**e-mail**	Husam.a@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		6/8/2025	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC23110	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- A short overview of computer graphics, introducing many concepts that will be covered in much more detail in the rest of this semester. 2- Two-dimensional graphics in Java will be explained, with an emphasis on ideas such as transformations and scene graphs that carry over to three dimensions. 3- OpengGL 1.1 basic features that are still fundamental to three-dimensional computer graphics, in a form that is an easier starting point for people new to 3D graphics. Only part of the API is covered. 4- Covers three.js, a higher-level object-oriented 3D graphics API for Web graphics using JavaScript. This part shows how fundamental concepts can be used in a higher-level Preface ix interface. 5- Cover WebGL, a modern version of OpenGL for graphics on the Web. WebGL is very low-level, and it requires the programmer to write “shader programs” to implement many features that are built into OpenGL 1.1. Looking at the implementation is an opportunity to understand more deeply how computers actually make 3D images. 6- look very briefly at some advanced techniques that are not possible in OpenGL.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. will learn the Two-dimensional graphics in Java, with an emphasis on ideas such as transformations and scene graphs. 2. OpengGL 1.1 basic features and part of the API is taught. 3. Will learn how to use three.js, a higher-level object-oriented 3D graphics API for Web graphics using JavaScript. 4. Will learn WebGL, a modern version of OpenGL for graphics on the Web.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Fast over view to the main concepts of a programing language in general, how to input and output information, different data structures. [15 hrs] One-, two- and three-dimension array definition and tracing, different arithmetic operations that can be applied to arrays. [10 hrs] Graphics in java will be explained in details, with most general forms of graphics. [10 hrs] OpengGl will be described in details, with the functions and facilities available. [15 hrs] Revision problem classes [6 hrs]`

Learning and Teaching Strategies اس رتاتيجيات 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 programing skills in computer science. This will be achieved through classes, exercises and lab by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدرا يس غ رت المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	3, 5, 7 and 9	LO #1, #2, #3, and #4
	Assignments	2	10% (10)	5	LO #2
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0			LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #4
	Final Exam	3hr	60% (50)	10	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Painting and Drawing, Elements of 3D Graphics, Hardware and Software
Week 2	Two-Dimensional Graphics, Pixels, Coordinates, and Colors, Pixel Coordinates, Real-number Coordinate Systems, Aspect Ratio, Color Models

Week 3	Shapes, Basic Shapes, Stroke and Fill, Polygons, Curves, and Paths
Week 4	Transforms, Viewing and Modeling, Translation, Rotation, Combining Transformations, Scaling, Shear, Window-to-Viewport, and Matrices and Vectors.
Week 5	Hierarchical Modeling, Building Complex Objects, Scene Graphs, and The Transform Stack
Week 6	Java Graphics2D, Graphics2D, Shapes, Stroke and Fill, Transforms, BufferedImage and Pixels
Week 7	HTML Canvas Graphics, The 2D Graphics Context, Shapes, Stroke and Fill, Transforms, Auxiliary Canvases, Pixel Manipulation, and Images
Week 8	Mid Term
Week 9	SVG: A Scene Description Language, SVG Document Structure, Shapes, Styles, and Transforms, Polygons and Paths, Hierarchical Models, and Animation
Week 10	OpenGL 1.1: Geometry, Shapes and Colors in OpenGL 1.1, 3D Coordinates and Transforms, Projection and Viewing, Polygonal Meshes and glDrawArrays, Some Linear Algebra, Using GLUT and JOGL
Week 11	Three.js: A 3D Scene Graph API, Three.js Basic, Building Objects, Other Features.
Week 12	Introduction to WebGL, The Programmable Pipeline, The WebGL Graphics Context, The Shader Program, Data Flow in the Pipeline, Values for Uniform Variables, Values for Attributes, Drawing a Primitive, WebGL 2.0: Vertex Array Objects, and WebGL 2.0: Instanced Drawing.
Week 13	First Examples, WebGL Context Options, A Bit of GLSL, The RGB Triangle in WebGL, Shape Stamper, The POINTS Primitive, and WebGL Error Handling
Week 14	3D Graphics with WebGL, Transformations in 3D, Lighting and Material, Textures, Framebuffers, and WebGL Extensions.
Week 15	Beyond Basic 3D Graphics, Ray Tracing, Ray Casting, Recursive Ray Tracing,. Limitations of Ray Tracing, Path Tracing.
Week 16	Mid Term

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to graphics
Week 2	Lab 2: Two-Dimensional Graphics
Week 3	Lab 3: Transforms
Week 4	Lab 4: Hierarchical Modeling
Week 5	Lab 5: HTML Canvas Graphics
Week 6	Lab 6: SVG
Week 7	Lab 7: OpengGL
Week 8	Lab 8: Three.js
Week 9	Lab 9: Introduction to WebGL
Week 10	Lab 10: 3D Graphics with WebGL

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to Computer Graphics, Version 1.3, August 2021, David J. Eck, Hobart and William Smith Colleges	No
Recommended Texts	Computer Graphics Lecture Notes, CSC418 / CSCD18 / CSC2504, Computer Science Department, University of Toronto, Version: November 24, 2006.	No
Websites	https://math.hws.edu/eck/cs424/downloads/graphicsbook-linked.pdf https://www.dgp.toronto.edu/~hertzman/418notes.pdf	

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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	MACHINE LEARNING			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC36127				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Amer A. Abdulrahman		**e-mail**	amer.abdulrahman@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Professor Assistant		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC12009, CSC35119	**Semester**	2, 3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course is a comprehensive overview of machine learning. The goal is to build an understanding of the most common machine learning models. Given the widespread use of modern machine learning techniques, there is an urgent need for programmers and system designers to improve their understanding of modern machine learning techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: 1.Principles of machine learning, 2.Develop an appreciation for what is involved in Learning models from data 3- Understand a wide variety of learning algorithms 4- Understand how to evaluate models generated from data 5-machine learning in real world 6. Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Understand the concept of learning in computer and science. Understand the difference between supervised and unsupervised learning. Understand the difference between machine lea ring and deep learning. Design and evaluate machine and deep learning algorithms.

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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)		LO #
	Assignments	2	10% (10)		LO #
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)		LO
Summative assessment	**Midterm Exam**	2hr	10% (10)		LO
	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 Machine Learning
Week 2	Machine learning Life cycle
Week 3	Gathering Data
Week 4	Data preparation
Week 5	Data Wrangling
Week 6	Analyze Data
Week 7	Train the model
Week 8	Samples of supervise algorithms
Week 9	Samples of unsupervised algorithms
Week 10	Samples of reinforcement algorithms
Week 11	Test the model
Week 12	Model Deployment
Week 13	Mid-term Exam
Week 14	Machine learning in real world
Week 15	Applications of Machine learning
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Machine Learning for Predictive Data Analytics by John D. Kelleher, Brian Mac Namee, and Aoife D'Arcy	No
Recommended Texts		
Websites	https://www.chegg.com/textbooks/fundamentals-of-machine-learning-for-predictive-data-analytics-1st-edition-9780262029445-0262029448	

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.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fundamental of Database System			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC36128				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	UGx1 3		**Semester of Delivery**	6	
Administering Department	Computer Science		**College**	Science	
Module Leader	Mehdi G. Duaimi		**e-mail**	mehdi.k@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	6/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC23110	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Defining and explaining fundamental of database concepts. 2. Designing a database schema. 3. Executing SQL statements for data retrieval and manipulation. 4. Understanding the role of databases in applications. 5. Performing data modeling and schema design. 6. Optimizing query performance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Understanding fundamental database concepts. 2. Recognizing the role of databases in applications. 3. Performing data modeling and schema design. 4. The database designer is responsible for creating standards and database policies and maintenance. 5. Query and manipulate data using SQL. 6. Optimizing data querying for performance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Databases: [10 hrs] • Overview and applications of databases. 2. Data Models and Relational Databases: [10 hrs] • ER modeling and relational databases. 3. Database Design: [10 hrs] • Database design process: requirements analysis, conceptual design, and logical design. 4. Database Querying: [10 hrs] • SQL syntax, retrieval, and manipulation. 5. Database Management and Administration: [5 hrs] 6. Relational algebra and SQL. [15 hrs] 7. Data Integrity and Constraints: [5 hrs] • Keys, referential integrity, and constraints.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Instructors aim to consolidate active learning and critical thinking by engaging students in practical activities such as designing database schemas, writing SQL queries, and solving real-world database challenges. The strategy encourages collaboration, independent problem-solving, and the use of technology tools to enhance the learning experience. This will be achieved through classes, interactive tutorials and by considering types of various lab. assignments; involving some activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 11	LO #1, #2 and #5
	Assignments	2	5% (5)	2 and 10	LO #3, #4 and #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	13	LO #2, #5 and #6
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 -- #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Database System Concepts
Week 2	Database Architecture
Week 3	Database Management System
Week 4	Database Schema & Database Users
Week 5	The Entity Relationship Data Model
Week 6	Relational Integrity & The Enhanced E-R Model and Business Rules
Week 7	Conceptual Design with the ER Model
Week 8	Queries and Updates in SQL
Week 9	The Relational Data Model
Week 10	Mapping from ER Diagrams to Relational Model
Week 11	SQL and DBMS Functionality
Week 12	Constraints and Keys
Week 13	Defining a Relation Schema in SQL
Week 14	DBMS Generalization & Specialization
Week 15	Relational Algebra Syntax and Semantics
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Main MS Office Access Objects
Week 2	Planning a Database Design Structure; Creating and working with Tables
Week 3	Creating tables using datasheet view
Week 4	Creating tables using design view; Field grid pane; Field properties
Week 5	Lookup tab and lookup wizard; Format and input mask properties
Week 6	Importing and Linking from an External Source;
Week 7	Splitting the database into front end and backend
Week 8	Types of keys and relational integrity; Setting Primary Key
Week 9	Setting Index Properties; Setting Table Properties
Week 10	Setting Relationships between Tables; Setting Foreign Key
Week 11	Introduction to SQL and Query types;
Week 12	Creating and working with Queries (QBE)
Week 13	Creating and working with SQL view
Week 14	Data Definition Language; Data Control Language (database security)
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	➢ Raghu Ramakrishnan , Johannes Gehrke, "Database Management Systems", 4th Edition, McGraw Hill, 2018. ➢ S. Sumathi, S. Esakkirajan, "Fundamentals of Relational Database Management Systems", Springer, 2007.	As a pdf
Recommended Texts	➢ David M. Kroenke, David J. Auer. "Database processing : fundamentals, design, and implementation."—Edition 15, Pearson Education, Prentice Hall. 2018. ➢ Mike McGrath. 'Access in easy steps: Illustrated using Access 2019 Paperback. In Easy Steps Limited (2019).	As a pdf
Websites	➢ https://www.inderscience.com/jhome.php?jcode=ijiids ➢ https://www.sciencedirect.com/topics/immunology-and-microbiology/database-management-system	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	CRYPTOGRAPHY			**Module Delivery**	
Module Type	CORE			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CSC36129				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Computer Science department		**College**	College of Science	
Module Leader	Sarab M. Hameed		**e-mail**	sarab.m@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	5/8/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSC12105, CSC12006	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	By the end of this course, students will be able to: **1.** Explain the fundamental principles, goals, and terminology of cryptography in the context of information security. **2.** Analyze classical and modern encryption algorithms to evaluate their design, strengths, and limitations. **3.** Apply appropriate cryptographic methods to secure data in various real-world scenarios. **4.** Implement encryption, decryption, and cryptanalysis algorithms using a high-level programming language. **5.** Evaluate cryptographic protocols for confidentiality, integrity, authentication, and non-repudiation
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.** Define key cryptographic concepts, goals, and terminology, including confidentiality, integrity, authentication, and non-repudiation. **2.** Demonstrate the use of mathematical foundations—such as modular arithmetic, prime factorization, and number theory—in cryptography. **3.** Implement classical ciphers (e.g., Caesar, Vigenère, Playfair) and modern encryption algorithms (e.g., DES, AES, RSA) using a programming language. **4.** Analyze the strengths and vulnerabilities of various symmetric and asymmetric encryption algorithms. **5.** Apply hashing and digital signature techniques to ensure message integrity and authenticity
Indicative Contents المحتويات الإرشادية	**Part A – Classical Cryptography** In this part, the student will learn the fundamental principles of classical cryptography, which form the foundation of modern encryption systems. In earlier courses, the student may have encountered basic concepts of data confidentiality and integrity. In this part, the focus shifts to practical methods of securing information using classical encryption algorithms. Students will study substitution ciphers, such as the Caesar, Affine, Vigenère, Playfair, and Hill ciphers, as well as transposition ciphers, including the Rail Fence and Columnar Transposition. The concept of cryptanalysis—breaking classical ciphers—will also be covered, including techniques such as frequency analysis and brute force attacks. **Part B – Modern Cryptography** In this part, the student will learn the principles and applications of modern cryptography, which are essential for securing digital communication in real-world systems. The student will study symmetric-key algorithms such as DES, 3DES, and AES, including block cipher modes of operation. (The part also covers asymmetric-key algorithms (RSA, Diffie–Hellman, etc.). In addition, students will learn about hash functions and message authentication codes and digital signatures for ensuring integrity and authenticity.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Core cryptographic concepts, algorithms, and protocols will be introduced through interactive lectures supported by visual aids, diagrams, and real-world examples. 2. Hands-on Laboratory Sessions: Students will implement encryption, decryption, and cryptanalysis techniques using programming languages. 3. Problem-Solving Exercises: Practical challenges and cryptographic puzzles will be assigned to develop analytical and critical thinking skills. 4. Group Discussions and Case Studies – Students will analyze case studies of cryptographic applications and failures to understand theoretical concepts. 5. Project-Based Learning: A final project will require students to design and implement multiple cryptographic techniques learned in the course.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
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	15% (15)	2, 7 ,10	
	Assignments	2	5% (5)	2, 3, 4,5,14	
	Projects / Lab.	1	15% (15)	Continuous	
	Report	1	5% (5)	11	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	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 cryptography
Week 2	Basic Number Theory for Cryptography
Week 3	Monoalphabetic Substitution Ciphers and Cryptanalysis
Week 4	Polyalphabetic and polygraphic Substitution Ciphers
Week 5	Transposition Ciphers
Week 6	One-time pad and stream ciphers
Week 7	Mid-term Exam
Week 8	Block Cipher Basics
Week 9	Data Encryption Standard
Week 10	Advanced Encryption Standard
Week 11	Mode of operation
Week 12	Asymmetric Cryptography: RSA
Week 13	Key Exchange: Diffie–Hellman
Week 14	Hash Functions and Message Authentication Codes
Week 15	Digital signatures
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to CrypTool
Week 2	Implement Caesar
Week 3	Perform frequency analysis on Caesar
Week 4	Implement modular arithmetic, GCD, and modular inverse
Week 5	Implement Affine cipher
Week 6	Implement Vigenère cipher
Week 7	Midterm exam
Week 8	Implement Playfair
Week 9	Rail Fence cipher
Week 10	Implement Columnar Transposition
Week 11	Encrypt/Decrypt with DES Using Cryptographic Library
Week 12	Implement AES in CBC, CFB, and CTR modes, and compare ciphertext patterns.
Week 13	Implement RSA
Week 14	Project Work
Week 15	Recap

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	1.D. Boneh and V. Shoup, *A Graduate Course in Applied Cryptography*, Version 0.6, 2020. [Online]. Available: https://crypto.stanford.edu/~dabo/cryptobook/ 2.W. Stallings, *Cryptography and Network Security: Principles and Practice*, 8th ed., Pearson, 2016. 3.Katz and Y. Lindell, *Introduction to Modern Cryptography*, 3rd ed., CRC Press, 2020. 4.C. Paar and J. Pelzl, *Understanding Cryptography: A Textbook for Students and Practitioners*, 2nd ed., Springer, 2019.	
Websites	https://www.cryptool.org/en/ https://cryptobook.nakov.com/ https://csrc.nist.gov/projects/cryptographic-standards-and-guidelines http://practicalcryptography.com/	

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.

Module Descriptor Form
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Scientific Research			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	UOB309				
ECTS Credits	1				
SWL (hr/sem)	25				
Module Level	Gx11 3		**Semester of Delivery**	6	
Administering Department	CSC		**College**	COS	
Module Leader	Dhuha Abdulhadi Abduljabbar		**e-mail**	dhuha.abd@sc.uobaghdad.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval	6/8/2025		**Version Number**		

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 course aims to teach students the key concepts of Research Methodology, and the main stages of the research process, including: how to define and formulate a research problem, literature review, various research methods, sampling, data source - explaining the primary & secondary methods of data collection, research preparation, and explaining the structure of research paper in detail.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	At the end of this course, the students should be able to: • demonstrate knowledge of research processes and its basic concepts. • understand how to find and select an appropriate research problem, the sources of literature review collection and the key steps for writing it, similarities and differences between the two key categories of research approach (i.e. Quantitative and Qualitative Research Approaches), and an understanding the various methods for collecting data, as well as understanding the key steps for research preparation in details.
Indicative Contents المحتويات الإرشادية	Inductive content includes the following: - Research Methodology: review the fundamentals, the definition of the research, the objectives of research, motivation in research, general characteristics of research, and types of research [4 hr]. - The Research Problem: what is a research problem, selecting the problem, sources of the problem, statement of a problem, and evaluation of a problem [4 hr]. - The Review of Literature: meaning of review of literature, objectives of review of literature, sources of literature, and reporting the review of literature [4 hr]. - The Research Approach: the Qualitative approach, the Quantitative approach, the Mixed-Methods approach, and criteria for selecting a research approach [4 hr]. - Data Collection Methods: Questionnaires, interviews, focus Groups, and observation [4 hr]. - Sampling: meaning and definition of sampling, functions of population and sampling, and methods of sampling [4 hr]. - Preparation of the Research: characteristics of a good research title, structure of research paper, including: abstract, introductions, review of the literature, methodology, result & discussions, conclusions, and references [6 hr].

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	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	7	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3hr / 2	8% (8)	3 and 8	LO #1
	Assignments	4hr / 2	10% (10)	5 and 11	LO #1
	Report	10hr / 1	10% (10)	10	All
	Presentation	7hr / 2	10% (10)	6 and 13	All
	Field Visit	1hr / 1	2% (2)	Continuous	
Summative assessment	**Midterm Exam**	8hr / 1	10% (10)	7	
	Final Exam	12hr / 1	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Research Methodology –Part 1
Week 2	Introduction to Research Methodology –Part 2
Week 3	The Research Problem –Part 1
Week 4	The Research Problem –Part 2
Week 5	The Review of Literature –Part1
Week 6	The Review of Literature –Part2
Week 7	The Research Approach –Part1
Week 8	The Research Approach –Part2
Week 9	Data Collection Methods –Part1
Week 10	Data Collection Methods –Part2
Week 11	Sampling –Part1
Week 12	Sampling –Part2
Week 13	Preparation of the Research – part 1
Week 14	Preparation of the Research – part 2
Week 15	Preparation of the Research – part 3
Week 16	Preparatory week before the final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Mishra, S. B., & Alok, S. (2022). Handbook of research methodology. 2. Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*. Bridge Center. 3. Tullu, M. S. (2019). Writing the title and abstract for a research paper: Being concise, precise, and meticulous is the key. *Saudi journal of anaesthesia*, *13*(Suppl 1), S12. 4. Bhardwaj, P. (2019). Types of sampling in research. *Journal of the Practice of Cardiovascular Sciences*, *5*(3), 157.	Available online

	5. Kumar, R. (2018). *Research methodology: A step-by-step guide for beginners*. Sage. 6. Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business & technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research*, *7*, 91-105. 7. Nallaperumal, K., & Krishnan, A. (2013). Engineering Research Methodology: A Computer Science and Engineering and Information and Communication Technologies Perspective. *no. December*. 8. Creswell, J. W. (2008). The selection of a research design. *Research Design-Qualitative, Quantitative, and Mixed Method Approaches*-, 3-22. 9. Goddard, W., & Melville, S. (2004). *Research methodology: An introduction*. Juta and Company Ltd. 10. Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.	
Recommended Texts		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.