



Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala
College of Engineering for Artificial
Intelligence Technology
Department of Cybersecurity Engineering



الملحق ٤: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Operating Systems		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	CSE 206		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Cybersecurity Eng.	College	College of Artificial Intelligence Engineering Technology
Module Leader	Ali N. Albu-Rghaif	e-mail	ali.alburghaif@uodiyala.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	14/05/2026	Version Number	1.0

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



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Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand fundamental operating system concepts and architectures. 2. Explore process, memory, and resource management mechanisms. 3. Compare Windows and Linux operating systems from a cybersecurity perspective. 4. Develop practical skills in system administration using virtual environments. 5. Introduce basic operating system security concepts and system monitoring.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students will be able to: 1. Explain the core concepts of operating systems and their role in computing systems. 2. Analyze process scheduling, synchronization, and deadlock handling techniques. 3. Describe memory management and virtual memory concepts. 4. Compare Windows and Linux operating system architectures. 5. Perform basic system administration tasks in Windows and Linux environments. 6. Understand file system structures and permission mechanisms. 7. Interpret system logs and basic auditing information. 8. Apply virtualization tools (VirtualBox) to simulate operating system environments.
Indicative Contents المحتويات الإرشادية	• Introduction to Operating Systems and Cybersecurity relevance. • Operating System Structures and Services. • Process Management and Scheduling Algorithms. • Threads and Concurrency Control. • Process Synchronization and Race Conditions. • Deadlocks: Prevention, Avoidance, and Recovery. • Memory Management and Virtual Memory. • File Systems (Windows NTFS and Linux ext4). • I/O Systems and Device Management. • Windows Operating System Architecture and Components. • Linux Operating System Architecture and Shell Environment. • Operating System Security Principles: ➤ Authentication and Authorization ➤ Access Control Models ➤ User and Privilege Management • System Monitoring, Logging, and Auditing.



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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	• Lectures supported by slides and real-world cybersecurity examples. • Interactive discussions and problem-solving sessions. • Demonstrations using VirtualBox for Windows and Linux environments. • Hands-on exercises for system navigation and administration. • Student-based assignments involving OS command usage and analysis. • Short quizzes and in-class activities to reinforce key concepts. • Encouraging self-learning through installation and practice on personal devices.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	6 and 12	LO #1 to #4 and #6 to #8
	Assignments	2	10% (5)	4, 7 and 10	LO #2, #3, #4, #5 and #7, #8, #9
	Classwork	2	10% (5)		
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	9	LO #1 - #7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Operating Systems and Cybersecurity Perspective
Week 2	System Structure and OS Services
Week 3	Processes and Process Management
Week 4	Threads and Concurrency
Week 5	Process Synchronization
Week 6	CPU Scheduling Concepts
Week 7	CPU Scheduling Algorithms
Week 8	Deadlock Concepts and Handling
Week 9	Windows Operating System Architecture
Week 10	Midterm Exam
Week 11	Linux Operating System Architecture
Week 12	Memory Management Concepts
Week 13	Virtual Memory Management
Week 14	File Systems and Permissions
Week 15	Operating System Security and System Monitoring
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Prac. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to VirtualBox and OS installation overview
Week 2	Installing Windows/Linux virtual machines
Week 3	Basic navigation in Windows OS
Week 4	Basic Linux shell commands
Week 5	Process monitoring (Task Manager / top, ps)
Week 6	User and group management basics
Week 7	File and directory operations (Windows & Linux)
Week 8	Process control and scheduling observation
Week 9	System services and startup management



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Week 10	Midterm practical review
Week 11	Memory and performance monitoring tools
Week 12	File permissions and access control
Week 13	Log files and system monitoring
Week 14	Basic system hardening concepts
Week 15	Final practical review and project task

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Silberschatz, Galvin, and Gagne, "Operating System Concepts", 9th edition, 2013.	No
Recommended Texts	- Andrew S. Tanenbaum, "Modern Operating Systems", 5th edition, 2022 - Deitel, Deitel and Choffnes, "Operating Systems", 3rd ed., Prentice Hall, 2004.	No
Websites	https://www.microsoft.com Official Microsoft documentation for Windows architecture, security, and system tools. https://www.kernel.org Official Linux kernel documentation and updates. https://ubuntu.com/tutorials Practical Linux tutorials and system administration guides. https://learn.microsoft.com/en-us/windows-server/ Windows system administration and security documentation. https://www.geeksforgeeks.org/operating-systems/ Simplified explanations and examples for OS concepts. https://www.tutorialspoint.com/operating_system/ Structured learning materials for operating systems.	



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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.				