

# Computer Fundamentals FORM

## نموذج وصف المادة الدراسية

<b>Module Information</b> معلومات المادة الدراسية			
<b>Module Title</b>	<b>Computer Fundamentals</b>		
<b>Module Type</b>	<b>Basic</b>		
<b>Module Code</b>	<b>UOMU0302013</b>		
<b>ECTS Credits</b>	<b>4</b>		
<b>SWL (hr/sem)</b>	<b>100</b>		
<b>Module Level</b>	<b>1</b>	<b>Semester of Delivery</b>	<b>1</b>
<b>Administering Department</b>	الأنظمة الطبية الذكية	<b>College</b>	العلوم
<b>Module Leader</b>	م.م. علي سليم حليم	<b>e-mail</b>	<a href="mailto:ali.saleem.haleem@uomus.edu.iq">ali.saleem.haleem@uomus.edu.iq</a>
<b>Module Leader's Acad. Title</b>	Assistant lecturer	<b>Module Leader's Qualification</b>	master
<b>Module Tutor</b>	م.م. علي سليم حليم	<b>e-mail</b>	<a href="mailto:ali.saleem.haleem@uomus.edu.iq">ali.saleem.haleem@uomus.edu.iq</a>
<b>Peer Reviewer Name</b>	أ.د. مهدي عبادي مانع	<b>e-mail</b>	<a href="mailto:mahdi.ebadi@uomus.edu.iq">mahdi.ebadi@uomus.edu.iq</a>
<b>Scientific Committee Approval Date</b>	<b>11/06/2025</b>	<b>Version Number</b>	<b>1.0</b>

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

<b>Module Aims, Learning Outcomes and Indicative Contents</b>	
<b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b>	
<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. Is to present, as clearly and completely as possible, the nature and characteristics of modern-day computer systems.</li> <li>2. Makes the students able to describe how computer works.</li> <li>3. Introduce the concepts of instruction sets and the nature of machine translation.</li> <li>4. To understand computer system architecture.</li> <li>5. Understand the concepts of abstraction and modular design translate from software to hardware and back to software.</li> <li>6. Learn how computer organization influences high-level languages, and vice versa.</li> <li>7. Prepare students for more in-depth study of advanced computer systems: compilers, operating systems, networking, security, and software engineering.</li> </ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. Help students to take an overview about computer evolution and generations.</li> <li>2. Let students know how the performance improved after ULS last generation of computer.</li> <li>3. To let them know what are computer SW/HW and measurement units and to know some system types.</li> <li>4. An ability to understand the basic structure of the processor.</li> <li>5. An ability to understand the basic structure of memory.</li> <li>6. Develop students' knowledge to differentiate between memory types.</li> <li>7. Student can understand how processors accelerate their execution time.</li> <li>8. To take close view of computer machine and their instructions.</li> <li>9. The students can improve their skills in programming by knowing operands of processor and how it dealing with them.</li> <li>10. Help students to understand how instruction represented in memory and how it accessed.</li> <li>11. Help students to understand how instruction represented in memory and how it accessed.</li> <li>12. Understand the key properties of magnetic disks, the performance issues involved in magnetic disk access, explain the concept of RAID and describe the various levels. Compare and contrast hard disk drives and solid disk drives. Describe in general terms the operation of flash memory and optical disk storage media.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	Indicative content includes the following. <u><a href="#">Part A – historical background</a></u>

	<p>A historical background is given to students to pave the way of their minds for modern computer architecture and let them know how the design of nowadays computers come to this point. [6 hrs]</p> <p><u>Part B – computer main components</u></p> <p>Processor, main memory, and input/output devices are the main components that we take in details along 9 lectures. [18 hrs]</p>
--	---

<h3>Learning and Teaching Strategies</h3> <p>استراتيجيات التعلم والتعليم</p>	
<b>Strategies</b>	Type something like: 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.

<h3>Student Workload (SWL)</h3> <p>الحمل الدراسي للطالب</p>			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<h3>Module Evaluation</h3> <p>تقييم المادة الدراسية</p>					
	<b>Time/Number</b>	<b>Weight (Marks)</b>	<b>Week Due</b>	<b>Relevant Learning Outcome</b>	
	<b>Quizzes</b>	2	10% (10)	5, 10	LO #1, 2, 10 and 11

<b>Formative assessment</b>	<b>Assignments</b>	1	10% (10)	12	LO # 3, 4, 6 and 7
	<b>Projects / Lab.</b>	1	10% (10)	continuous	
	<b>Report</b>	1	10% (10)		
<b>Summative assessment</b>	<b>Midterm Exam</b>	3 hr	10% (10)	7	LO # 1-7
	<b>Final Exam</b>	3 hr	50% (50)	16	All
<b>Total assessment</b>		100% (100 Marks)			

<b>Delivery Plan (Weekly Syllabus)</b>	
المنهاج الأسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	<p>Basic Concepts and Computer Evolution</p> <ul style="list-style-type: none"> <li>• Why Study Computer Fundamentals?</li> <li>• Organization and Architecture</li> <li>• Define the Computer</li> <li>• What Is Data and Information</li> </ul> <p>Historical Background (Computer Generations)</p>
<b>Week 2</b>	<p>Performance Issue (part I)</p> <ul style="list-style-type: none"> <li>• Designing for performance</li> <li>• Microprocessor speed</li> <li>• Performance balance</li> <li>• Improvements in Chip Organization and Architecture</li> <li>• Multicore, Mics, and GPGPUs</li> </ul> <p>Basic Measures of Computer Performance (clock speed, Instruction Execution Rate)</p>
<b>Week 3</b>	<p><b>Performance Issue (Part II)</b></p> <ul style="list-style-type: none"> <li>• Computer Components</li> <li>• Measurement Units</li> <li>• Embedded Systems</li> </ul> <p>Cloud computing</p>
<b>Week 4</b>	<p><b>Processing Unit Design</b></p> <ul style="list-style-type: none"> <li>• CPU Basics</li> <li>• What are CPU tasks</li> <li>• Processor Organization</li> <li>• Register Set \types\design issues</li> <li>• Data path</li> </ul> <p>CPU Instruction Cycle</p>
<b>Week 5</b>	<p><b>Memory System Design (part I)</b></p> <ul style="list-style-type: none"> <li>• Basic Concepts</li> <li>• Cache Memory</li> </ul>
<b>Week 6</b>	<p><b>Memory System Design (part II)</b></p> <ul style="list-style-type: none"> <li>• Main Memory</li> <li>• Virtual Memory</li> <li>• Read-Only Memory</li> </ul>
<b>Week 7</b>	Mid-term Exam1

<b>Week 8</b>	<b>Input–Output Design and Organization</b> <ul style="list-style-type: none"> <li>• Basic Concepts</li> <li>• Input –Output Interfaces</li> <li>• Programmed I/O</li> <li>• Interrupt-Driven I/O</li> <li>• Direct Memory Access (DMA)</li> </ul> Buses
<b>Week 9</b>	<b>Pipelining Design Techniques</b> <ul style="list-style-type: none"> <li>• Why to Use Pipelining</li> <li>• General Concepts</li> <li>• Pipelining Strategy/Instruction Pipeline.</li> </ul> Example Pipeline Processors
<b>Week 10</b>	<b>Instruction Set Architecture and Design (part I)</b> <ul style="list-style-type: none"> <li>• What is instruction set concept</li> <li>• Machine Instruction Characteristics</li> <li>• Elements of a Machine Instruction</li> <li>• Instruction Representation</li> <li>• Instruction Types</li> </ul> Number of Addresses
<b>Week 11</b>	<b>Instruction Set Architecture and Design (part II)</b> <ul style="list-style-type: none"> <li>• Instruction Set Design</li> <li>• <b>Types of Operands</b> <ul style="list-style-type: none"> <li>➤ Numbers</li> <li>➤ Characters</li> </ul> </li> </ul> Logical Data
<b>Week 12</b>	<b>Addressing Modes (part I)</b> <ul style="list-style-type: none"> <li>• Immediate Addressing</li> <li>• Direct Addressing</li> <li>• Indirect Addressing</li> <li>• Register Addressing</li> </ul> Register Indirect Addressing
<b>Week 13</b>	<b>Addressing Modes (part II)</b> <ul style="list-style-type: none"> <li>• Displacement Addressing</li> </ul> Stack Addressing
<b>Week 14</b>	<b>External Memory</b> <ul style="list-style-type: none"> <li>• Magnetic Disk</li> <li>• RAID</li> <li>• Solid State Drives</li> </ul> Optical Memory
<b>Week 15</b>	Mid-term exam 2
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

## Learning and Teaching Resources

مصادر التعلم والتدریس

	Text	Available in the Library?
Required Texts	<b>COMPUTER ORGANIZATION AND ARCHITECTURE</b> <b><i>DESIGNING FOR PERFORMANCE, ELEVENTH EDITION,</i></b> <b>William Stallings, Pearson, 2019, ISBN-10: 0-13-499719-0</b> <b>www.pearsonhighered.com ISBN-13: 978-0-13-499719-3</b>	Yes
Recommended Texts		
Websites		

## Grading Scheme

مخطط الدرجات

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