

<b>Discrete Structures</b> معلومات المادة الدراسية				
<b>Module Title</b>	<b>Discrete Structures</b>		<b>Module Delivery</b>	
<b>Module Type</b>	<b>Core</b>		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar	
<b>Module Code</b>	<b>MU010601103</b>			
<b>ECTS Credits</b>	<b>7</b>			
<b>SWL (hr/sem)</b>	<b>175</b>			
<b>Module Level</b>	1	<b>Semester of Delivery</b>		1
<b>Administering Department</b>	Type Dept. Code	<b>College</b>	Type College Code	
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<b>Module Leader's Acad. Title</b>	Lecturer	<b>Module Leader's Qualification</b>	Ph.D.	
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<b>Scientific Committee Approval Date</b>		<b>Version Number</b>	1.0	

<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> أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
<b>Module Objectives</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. This course is an introductory text on a number of topics in discrete mathematics, intended primarily for students undertaking a first degree in computer science.</li> <li>2. The material of this course has been divided into seven chapters covered on 15 weeks.</li> <li>3. The basic areas covered: Sets, mathematical induction, Relations, Functions, Logic, Groups and Graphs.</li> <li>4. Each chapter begins with a clear statement of pertinent definitions, principles and theorems together with illustrative.</li> <li>5. This is followed by sets of solved problems. The solved problems serve to</li> </ol>

	illustrate and amplify the theory.
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> <li>1. Understand sets and perform operations and algebra on sets.</li> <li>2. Prove mathematical theorems using mathematical induction.</li> <li>3. Determine properties of relations, identify equivalence and partial order relations, sketch relations.</li> <li>4. Identify functions and determine their properties.</li> <li>5. Define graphs, digraphs and trees, and identify their main properties.</li> <li>6. Evaluate combinations and permutations on sets.</li> <li>7. Analyze logical propositions via truth tables.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	<p>The basic areas covered: Sets, mathematical induction, Relations, Functions, Logic, Groups and Graphs.</p> <ul style="list-style-type: none"> <li>• Introduce concepts of sets, and use the properties of set operations algebraically.</li> <li>• Use mathematical induction to prove some types of problem.</li> <li>• Investigate functions as relations and their properties.</li> <li>• Introduce mathematical logic for analyzing propositions and proving theorems.</li> <li>• Introduce basic concepts of graphs, digraphs and trees</li> </ul>

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p><b>Assessment Strategy</b></p> <p>This course is designed to further the student's understanding of mathematics, to lead students to connect the mathematics to its application in computer science and to encourage the students to communicate their ideas and their expertise to the professional community. With this in mind, the course grade involves an assessment of their performance on in-class quizzes and exams that focus on the applications of discrete mathematics to computer science.</p> <ul style="list-style-type: none"> <li>• Weekly assigned homework to motivate students to do the work and earn credit accordingly.</li> <li>• Weekly in-class quizzes</li> <li>• Weekly, in-class presentations by students of solutions to real world problems related to the course material and classroom discussion and critique of the presentation.</li> <li>• Three in-class exams to assess the student's accumulative mastery of content covered prior to time of exam.</li> <li>• A comprehensive final exam to assess the student's accumulative mastery of course material.</li> </ul>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً
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<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	<b>175</b>		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	20% (20)	5 and 10	LO #1 - #2 and LO #4 - #5
	<b>Assignments</b>	2	10% (10)	2 and 12	LO #3 , #4 and #6
	<b>Projects / Lab.</b>				
	<b>Report</b>	1	10% (10)	13	All
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	10% (10)	7	LO #1 - #4
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	<b>Set theory/</b> concept of a set, representation of sets, sub set, equality of sets, universal set
<b>Week 2</b>	<b>Set theory/</b> empty set, disjoint sets, venn diagrams, set operations, union, intersection, Cartesian product, complements, differences, symmetric differences,
<b>Week 3</b>	<b>Mathematical induction/</b> principle of mathematical induction, some examples of mathematical induction
<b>Week 4</b>	<b>Graph theory/</b> sample graph, pseudo graph, multi graph, sub graph, finite graph. propositions, biconditional propositions
<b>Week 5</b>	<b>Graph theory/</b> degree of vertex, special families of graphs, complete graph, complete bipartite.
<b>Week 6</b>	<b>Relations/</b> definition of relation, range of relation, domain of relation, representation of relations
<b>Week 7</b>	<b>Relations/</b> inverse relation, number of relations, types of relations, reflexive, symmetric, anti-symmetric, transitive, and equivalence.
<b>Week 8</b>	<b>Functions/</b> definition of function, range of function, domain of function
<b>Week 9</b>	<b>Functions/</b> injection functions, surjections, composite functions, inverse function

Week 10	Mutual Inductance, Linear and Ideal Transformers, Circuits with Mutual Inductance
Week 11	Logic
Week 12	Logic
Week 13	Matrices/ definition of matrices, Square matrix, diagonal matrix, identity matrix, sum of matrices, multiplication of matrices, transpose of matrix
Week 14	Matrices/ some types of matrices, upper and lower triangle matrix, symmetric matrix, conjugate matrix, Hermitian matrix, skew Hermitian matrix, trace,
Week 15	Matrices/ Gaussian Elimination , Gaussian-Jordan, Inverse of matrices, Determinants of matrix,
Week 16	Preparatory week before the final Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Discrete Mathematics for New Technology /Second Edition/Rowan Garnier and John Taylor/ university of Brighton, UK 2002	Yes
Recommended Texts	Mathematics for Computer Science, Eerc Lehman and Tom Leighton 2004.	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
<b>Fail Group (0 – 49)</b>	<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.