	Ministry of Higher Education and Scientific Research - Iraq University of Technology Computer Science Department Information System Branch	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Discrete Structures			**Module Delivery**	
Module Type	BASIC			**Theory** **Lecture** **Tutorial** **Practical** **Seminar**	
Module Code	DIST122				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ammar Fakhri Mahdi		**e-mail**	ammar.f.mahdi@uotechnology.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc. in computer science	
Module Tutor	None		**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**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	1. The study of fundamentally discrete mathematical structures, in the sense of not supporting the concept of continuity. 2. Studying computer data representation methods that achieve easy storage and retrieval and processing speed. 3. Logical formulas are described by the discrete structure, which is used to create directed acyclic graph structures and finite trees. A finite set is produced by the truth values of logical formulas.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The ability to develop and conduct appropriate experiments, analyse and interpret data, and use engineering judgment to draw conclusions 2. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies. Topics include: sets, number bases, mathematical induction, relations, functions, graphs, trees,
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. ➢ Set theory • Sets and subsets • How to specify sets, Operations on sets • Algebra of sets and its proves • Power set, Classes of sets, Cardinality • Sets of numbers, Finite sets and counting principle ➢ Mathematical induction ➢ Relations • Computer representation of relations and Digraph • Manipulation of relations, Properties of relations • Composition of relations ➢ Functions • Type of function (one-to-one & invertible function) • Geometrical characterization of functions • Sequences of sets, Recursively defined functions ➢ Graphs • Definition, Graphs. Sub graph, and multigraphs • Degree of graph, Connectivity, Special graph • Walk & length of walk, Trail, path, cycle • The bridges of Konigsberg • Traversable multigraphs, Labeled graphs • Minimal path, Minimum spanning tree • Matrices and graph • Trees, rooted tree, ordered rooted tree

	• polish notation, with examples ➢ Finite state machines • Finite automata • Optimistic approach to construct FSM • Deterministic Finite state automata

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to: 1. 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. 2. Use Live electronic lectures - video lectures 3. Solve practical examples

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.9
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**		15% (5)		
	Assignments		5% (5)		
	Projects / Lab.		10		
	Report		10		
Summative assessment	**Midterm Exam**		10% (20)		
	Final Exam		50% (70)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Set theory-sets & subsets, how to specify sets, operations on sets,**
Week 2	**Algebra of sets and its proves, Power set, Classes of sets, Cardinality.**
Week 3	**Sets of numbers, Finite sets and counting principle**
Week 4	**Mathematical induction**
Week 5	**Computer representation of relations and Digraph, Manipulation of relations.**
Week 6	**Properties of relations, Composition of relations**
Week 7	**Type of function (one-to-one & invertible function), Geometrical characterization of functions**
Week 8	**Mid Exam**
Week 9	**Sequences of sets, Recursively defined functions, Definition, Graphs. Sub graph, and multigraphs**
Week 10	**Degree of graph, Connectivity, Special graph, Walk & length of walk, Trail, path, cycle**
Week 11	**The bridges of Konigsberg, Traversable multigraphs, Labeled graphs, Minimal path, Minimum spanning tree**
Week 12	**Matrices and graph, Trees, rooted tree, ordered rooted tree, polish notation, with examples**
Week 13	**Finite state machines: Finite automata**
Week 14	**Optimistic approach to construct FSM, Deterministic Finite state automata**
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• **Theory and problems of Discrete mathematics, by Seymour Lipschutz & Marc Lars Lipson, Schaum's Outline Series, third edition 2007** • **Mathematical foundation of computer science, Y.N. Singh, 2005.** • **Discrete Mathematics and Its Applications, Seventh Edition, Kenneth H. Rosen, AT&T Laboratories, 2012**	

Recommended Texts		No
Websites	• **DISCRETE STRUCTURES, AMIN WITNO, Revision Notes and Problems 2006, www.witno.com** • **Discrete mathematical structures for computer science by Bernard Kolman &Robert C. Busby** • **Discrete mathematics for New technology, Rowan Garnier, & John Taylor (Second Edition 2002).** **http://www.math.uvic.ca/faculty/gmacgill/guide**	

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.