

Module code	SM-1301		
Module Title	Discrete Mathematics		
Degree/Diploma	Bachelor of Science (Mathematics)		
Type of Module	Major Option		
Modular Credits	4	Total student Workload	10 hours/week
		Contact hours	4 hours/week
Prerequisite	A-Level Mathematics or equivalent		
Anti-requisite	None		
Aims			
To introduce concepts and techniques of mathematics (mostly discrete) needed for various areas of Mathematics and Computer Science. On completing this module, the student should be able to use the concepts and techniques of discrete mathematics to prove programme correctness, investigate algorithm complexity, set up economical computer networks and model computation.			
Learning Outcomes			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	30%	- describe the logic statements and write formal proof - describe sets, multi-sets and set of natural numbers	
Middle order :	60%	- understand counting techniques for counting permutations, combinations, bit strings and subsets	
Higher order:	10%	- describe minimum-weight spanning trees and minimum-distance trees	
Module Contents			
<ul style="list-style-type: none"> - Logic statements, connectives, canonical forms (CNF, DNF), inference, formal proof, predicates. - Sets, multi-sets; set of natural numbers, basic properties; countable sets. - Counting techniques for counting permutations, combinations, bit strings and subsets. - Relations: representations and manipulation through Boolean matrices, digraphs; Posets, Hasse diagrams. - Functions and their growth. - Algorithms: proof of correctness; computational complexity. - Graphs: vertex, edge; incidence, adjacency matrices, vertex degree; complete bipartite graphs; subgraphs, graph isomorphism; paths, cycles, connected graphs; Euler circuits, Hamilton cycles. - Trees: minimum-weight spanning trees, minimum-distance trees. - Modelling computation: languages, grammars; finite-state machines; Turing machines. 			
Assessment	Formative assessment	1 Weekly Tutorial and feedback.	
	Summative assessment	Examination: 60% Coursework: 40% - 2 Class tests (40%)	