1.	**Course Title**	**Discrete mathematics**		
2.	**Course Code**	**CMTH1513**		
3.	**Status**	Faculty		
4.	**Credit Hour**	3 (2+1) 2 lecture (2 hours lecture x 14 weeks) 1 tutorials (1.5 hours per x 14 weeks)		
5.	**Semester/Year**	1/2		
6.	**Prerequisites**	None		
7.	**Teaching method:**	Distance Learning (Electronic)		
8.	**Evaluation**	**Assessment and Marking Percentage:** Participation 5% Quizzes 15% Project 15% Mid Sem Exam 15% Final Examination 50%		
9.	**Lecturer**			
10.	**Objective of the Subject**	This subject is designed to enable students to: • To familiarize students with the notations and structures used in discrete mathematics; • To train students in acquiring mathematical competency in the relevant areas of computing; • To build a strong foundation for students who will be taking advanced courses in programming and algorithm development; • To develop a better understanding of the role of mathematics in good algorithm design.		
11.	**Learning Outcomes**	By the end of the subject, students should be able to: • Formulate expressions in propositional logic and apply the relevant rules used in propositional logic for mathematical proofs. • Identity, apply and communicate the different data structure i.e. sets sequences, rattle-bags etc. in problem analysis. • Apply probabilistic reasoning in solving non-deterministic random processes in computer science. • Formulate Boolean expressions for circuit design. • Map, state, and analyze problems in computer science into mathematical graph analysis.		
12.	**Synopsis**	Programming is a mathematical activity. This subject is essentially a mathematical course meant specifically for students of computing and software engineering. The subject covers a specific area of discrete mathematics, which encompasses logic, set theory, relations, graph theory, etc. the course will highlight a variety of topics such as mathematical induction, inductive hypothesis, mathematical logix (equivalence, implications, modus ponens, tautologies etc). Mathematical proofs, relations functions, mappings, graphs and abstract algebra (binary operation, commutative and associative operations etc). the knowledge gained from this course is meant to serve as a sound basis in understanding the fundamental concepts in programming, typically used in algorithm development and subsequently in building information systems.		
13.	**Topics**	Details	Lecture (Hrs)	Tutorial (Hrs)
	Week 1	Logic: proposition, truth table, implication and equivalence, tautology.	2	1.5
	Week 2	Consistency and contradiction, quantifiers, nested quantifiers.	2	1.5
	Week 3	Introduction to proofs 1: direct proofs indirect proofs, proof by contradiction, proof by contra positive, proof by cases, existence and uniqueness proofs	2	1.5

	Week 4	Introduction to proofs 11: constructive proofs, unconstructive proofs, rules of inference, proof methods and strategies	2	1.5
	Week 5	Sets: review of set theory, set operations, functions, sequences and summations	2	1.5
	Week 6	Algorithm and integers: algorithms, the growth of functions, the integers and division, primes and greatest common divisors	2	1.5
	Week 7	Induction and recursion: principle of mathematical induction, strong induction	2	1.5
	Week 8	Counting: basic counting techniques, the pigeonhole principle, permutations and combinations, binomial coefficients	2	1.5
	Week 9	Relations: Relations and their properties, representing relations equivalence relations	2	1.5
	Week 10	Graphs: graphs and graphs models graphs terminology	2	1.5
	Week 11	Trees: graphs and graphs models.	2	1.5
	Week 12	Graphs terminology.	2	1.5
	Week 13	Boolean functions representing Boolean functions logic gates.	2	1.5
	Week 14	Legal and ethical aspects	2	1.5
		Total contact hours	28	21
		Equivalent lecture hours	28	14
		Total lecture hours	42	
		Credit hours	3	
14.	**Main reference: Textbook:**	Rosen, H.K (2006). **Discrete mathematics and its application** (6th ed). New York: McGraw Co. Inc		
15.	**Additional References:**	1. Johnsonbaugh, R. (2004). **Discrete mathematics** (6th ed). Upper saddle River, New Jersey: Prentice Hall. 2. Kolman, B, Busby, R.C & Ross, S.C (2003). **Discrete mathematical structures** (4th ed). New Jersey: Prentice Hall.		
	Other Materials:	All materials will be available to the students online.		