Back To FORM @ TEMPLATE

1	Course Name:	Advanced Discrete Mathematics				
	Course Code:	BMMS2633				
	Course Classification:					
2	Synopsis:	This course introduces a blending of mathematics and computer science and stress basic theory and applications. The contents include trees, formal languages, finite-state machines, semigroups, groups and coding.				
3	Name(s) of Academic Staff:	1				
		2				
		3				
4	Semester and Year offered:	Year Offered		Semester		*Remarks:*
5	Credit Value:	3				
6	Pre-requisite/ co-requisite (if any):	BAMS1623 Discrete Mathematics				

7

Course Learning Outcomes (CLO)		
	CLO1	Analyse tree structures, languages, and finite-state machines using mathematical expressions and diagrams. (C4, PLO2)
	CLO2	Apply group theory to coding and decoding of binary information and Huffman code for data compression. (C3, PLO2)
	CLO3	

8 Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Course Learning Outcomes	Programme Learning Outcomes (PLO)												Teaching Methods	Assessment Methods
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11			
CLO1		√											L, T, NF2F	Test, Assignment, Examination
CLO2		√											L, T, NF2F	Assignment, Examination
CLO3														
Mapping with MQF Cluster of Learning Outcomes		C2												

Indicate the primary causal link between the CLO and PLO by ticking 'V' in the appropriate box.

C1 = Knowledge & Understanding, **C2** = Cognitive Skills, **C3A** = Practical Skills, **C3B** = Interpersonal Skills, **C3C** = Communication Skills, **C3D** = Digital Skills, **C3E =** Numeracy Skills**, C3F** = Leadership, Autonomy & Responsibility, **C4A** = Personal Skills, **C4B** = Entrepreneurial Skills, **C5** = Ethics & Professionalism

9 Transferable Skills (if applicable)

(Skills learned in the course of study which can be useful and utilized in other settings)

1	Cognitive skills
2	
3	

Open-ended response (if any)

4	

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10 Distribution of Student Learning Time (SLT)

Note: This SLT calculation is designed for home grown programme only.

	Course Content Outline and Subtopics	CLO*	Learning and Teaching Activities**									Total SLT
			Face-to-Face (F2F)								NF2F Independent Learning (Asynchronous)	
			Physical				Online/ Technology-mediated (Synchronous)					
			L	T	P	O	L	T	P	O		
1	Trees • Trees • Properties of trees • Labelled trees • Tree searching • Prefix form, infix form and postfix form of arithmetic expression • Binary search tree • Undirected trees • Spanning tree • Breadth-first search and depth first search • Minimal spanning trees • Prim's algorithm, Kruskal's algorithm	1	6	4.5							10.5	
2	Languages • Phrase structure grammar • Derivation tree • Backus-Naur Form • Syntax diagrams • Regular expressions • Types of grammars	1	5	4							7.5	
3	Semigroups and groups • Binary operations. • Semigroups, products and quotients of semigroups. • Monoid • Groups, subgroups • Cosets • Products and quotients of groups.	2	4	3							8	
4	Finite State Machines • Finite State machines. Transition table and transition diagram • Congruence relation and quotient machines • Moore recognition machine and Language of the machine • Simplification of Moore machines • Non-deterministic automata	1	6	4.5							11	
5	Coding • Coding of binary information and error detection. • Parity check code • Hamming distance • Maximum likelihood decoding • Group code • Decoding table • Syndrome decoding	2	5	3.5							7.5	
6	Code for Data Compression • Binary code of variable length, Prefix property • Huffman code for data compression • Lower bound for expected code length, Entropy, Relative efficiency	2	2	1.5							3.5	
7												
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11												
12												
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15												
16												
17												
18												

19												
20												
											SUB-TOTAL SLT:	**97**

Continous Assessement		%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment (Asynchronous)
			Physical	Online/ Technology-mediated (Synchronous)	
1	Test	25	1		4
2	Assignment	25			6
3					
4					
5					
					SUB-TOTAL SLT: **11**

Final Assessement		%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment (Asynchronous)
			Physical	Online/ Technology-mediated (Synchronous)	
1	Examination	50	2		10
2					
3					
4					
5					
					SUB-TOTAL SLT: **12**

	SLT for Assessment:	23
	GRAND TOTAL SLT:	120
A	% SLT for F2F Physical Component: *[Total F2F Physical /(Total F2F Physical + Total F2F Online + Total Independent Learning) x 100)]*	43.33
B	% SLT for Online & Independent Learning Component: *[(Total F2F Online + Total Independent Learning) /(Total F2F Physical + Total F2F Online + Total Independent Learning) x 100]*	**56.67**
C	% SLT for All Practical Component: *[% F2F Physical Practical + % F2F Online Practical]*	**0.00**
C1	% SLT for F2F Physical Practical Component *[Total F2F Physical Practical /(Total F2F Physical + Total F2F Online + Total Independent Learning) x 100)]*	**0.00**
C2	*% SLT for F2F Online Practical Component* *[Total F2F Online Practical / (Total F2F Physical + Total F2F Online + Total Independent Learning) x 100]*	**0.00**

Please tick (V) if this course is **Industrial Training/ Clinical Placement/ Practicum** using 50% of Effective Learning Time (ELT)

Note:

* Indicate the CLO based on the CLO's numbering in Item 8

** For ODL programme: Courses with mandatory practical requiremnets imposed by the programme standards or any related standards can be exempted from complying to the minimum 80% ODL delivery rule in the SLT.

11	Identify special requirement or resources to deliver the course (e.g., software, nursery, computer lab, simulation room etc)	NIL
12	References (include required and further readings, and should be the most current)	1. Epp, S. S. (2020). Discrete mathematics with applications (5th ed.). Cengage 2. Seymour Lipschutz, Marc Lipson, & McGraw Hill etextbook. (2021). Schaum's outline of discrete mathematics, 4th edition (fourth ed.). McGraw-Hill.
13	Other additional information (if applicable)	NIL

Note: Number of PLO indicated is purely for illustration purposes only and the number is subjected to the curriculum design.