	Teaching Plan **FAKULTI TEKNOLOGI MAKLUMAT DAN KOMUNIKASI** **UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

DISCRETE MATHEMATICS

DITI 1223	**SEMESTER 2**	**SESSION 2020/2021**

DITI 1223 DISCRETE MATHEMATICS (3, 2, 2)
TYPE OF COURSE: P
EDITION: 4
UPDATED: 11-02-2019

1.0 LEARNING OUTCOMES

Upon completion this course, students will be able to:

  i. Explain the basic concepts and techniques of Discrete Mathematics (C2)
 ii. Apply those concepts and techniques to related theoretical problems (C3, CTPS3)
iii. Propose solutions to problems in applied computer science with the assistance of an appropriate use of software (A3, LL2)

2.0 SYNOPSIS

This course introduces the fundamental concepts and techniques of Discrete Mathematics that are needed for computer science. It includes logics, sets, functions, counting, relations, graphs and trees along with their applications to problems in computer science.

3.0 PRE-REQUISITE

None

4.0 PRACTICAL

MATLAB technical computing software or other appropriate high level programming tools.

5.0 REFERENCES

[M] Rosen, K. H. and Krithivasan, K.   (2013).Discrete Mathematics and Its Applications. 7th Edition", McGraw-Hill.

[1] Malik, D. S. and Sen, M. K.   (2010). Discrete Mathematics: Theory and Applications. Revised Edition, Cengage Learning.

[2] Epp, S. S. (2011). Discrete Mathematics with Applications. 4th Edition, Cengage Learning.

[3] Velleman, D.J. (2009). How to Prove itL A Structured Approach, 2nd Edition, Cambridge.

[4] Deo, N. (2016). Graph Theory with Applications to Engineering and Computer Science, Dover Edition, Dover Publications.

6.0 COURSE IMPLEMENTATION

i. Lecture
- 2 hours per week for 14 weeks (Total = 28 hours)

ii. Laboratory Activities
- 2 hours per week for 14 weeks (Total = 28 hours)

7.0 COURSE EVALUATION

Assessment Method	LO 1	LO 2	LO 3
Quiz (Q)	Q1 (5%)	Q2 (5%)	
Assignment (A)			A (30%)
Mid Term (MT)	MT1 (15%)	MT2 (15%)	
Final (F)	FE1 (15%)	FE2 (15%)	
Total	**35%**	**35%**	**30%**

8.0 STUDENT LEARNING TIME (SLT)

LEARNING ACTIVITIES	STUDENT LEARNING TIME (BITI 1213)											
	GUIDED LEARNING TIME						INDEPENDENT LEARNING TIME					
	OFFICIAL CONTACT HOURS	FREQ	TOTAL	GUIDED LEARNING HOURS	FREQ	TOTAL	SELF STUDY HOURS	FREQ	TOTAL	ASSESSMENT TIME	FREQ	TOTAL
Lecture	2	14	28	-	-	-	2	14	28	-	-	-
Lab	2	14	28	-	-	-	2	12	24	-	-	-
Assignment	-	-	-	-	-	-	2	2	4	-	-	-
Quiz	-	-	-	-	-	-	0.5	2	1	0.3	2	0.6
MidTerm Exam	-	-	-	-	-	-	2	1	2	2	1	2
Final Exam	-	-	-	-	-	-	4	1	4	2	1	2
TOTAL	56			0			67			4.6		
GRAND TOTAL	127.6											
TOTAL CREDIT	3.19											

Minggu Week	CLO	Guided Learning Time (hr)				Independant Learning(hr)								Assessment Time (hr)				SLT
		L	T	P	O	L	T	P	O	F	T	A	O	F	T	A	O	
W1	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W2	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W3	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W4	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W5	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W6	0	2	2	0	0	1	1	0	0	0	1.2	0	0	0	0.3	0	0	7.5
W7	0	2	2	0	0	1	1	0	0	8	0	8	0	2	0	2	0	26
W8	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W9	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W10	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W11	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W12	0	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6
W13	0	2	2	0	0	1	1	0	0	0	1.2	0	0	0	0.3	0	0	7.5
W14	0	2	2	0	0	1	1	0	0	0	0	8	0	0	0	2	0	16
W15	0	0	0	0	0	0	0	0	0	8	0	0	0	2	0	0	0	10
Keseluruhan Overall		28	28	0	0	14	14	0	0	16	2.4	16	0	4	0.6	4	0	127
SLT Credit Equivalent																		3.18

8.0 DETAILED SYLLABUS AND TEACHING PLAN

Week	Session	Contents	References	Delivery Methods
1	**Lecture 1** **Tutorial 1**	**Fundamentals of Logics** **Lecture content** 1. Propositional Logic & Truth Table 2. Propositional Equivalences 3. Predicates & Quantifiers **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 1	[M, 1, 2, 3]	Lecture, Discussions
2	**Lecture 2** **Tutorial 2**	**Fundamentals of Proofs** **Lecture content** 1. Rules of Inference 2. Introduction to Proofs **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 2	[M, 1, 2, 3]	Lecture, Discussions
3	**Lecture 3** **Tutorial 3**	**Set Theory** **Lecture content** 1. Sets 2. Set Operations **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 3	[M, 1, 2]	Lecture, Discussions
4	**Lecture 4** **Tutorial 4**	**Functions** **Lecture content** 1. Functions 2. Inverse Functions 3. Function Composition 4. Sequences & Summations **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 4	[M, 1, 2]	Lecture, Discussions
5	**Lecture 5** **Tutorial 5**	**Algorithms** **Lecture content** 1. Algorithms 2. Properties of algorithm **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 5	[M, 1, 2]	Lecture, Discussions

6	**Lecture 6** **Tutorial 6**	**Integers** **Lecture content** 1. The Integers and Division 2. Integer Representation 3. Primes and Greatest Common Divisors **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 6	[M, 1, 2]	Lecture, Discussions
7	**Lecture 7** **Tutorial 7**	**Induction & Recursion** **Lecture content** 1. Mathematical Induction 2. Recursive Definitions **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 7	[M, 1, 2]	Discussions
8	**Lecture 8** **Tutorial 8**	**Induction & Recursion (continue)** **Lecture content** 3. Recursive Algorithms **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 8	[M, 1, 2]	Lecture, Discussions
9		**Mid Semester Break**		
10	**Lecture 9** **Tutorial 9**	**Counting** **Lecture content** 1. The Basics of Counting 2. The Pigeonhole Principle 3. Permutations and Combinations **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 9	[M, 1, 2]	Lecture, Discussions
11	**Lecture 10** **Tutorial 10**	**Relations** **Lecture content** 1. Relations and their Properties 2. Relations Representations 3. Closures of Relations **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 10	[M, 1, 2]	Lecture, Discussions

12	**Lecture 11** **Tutorial 11**	**Graphs** **Lecture content** 1. Introduction to Graphs 2. Representing Graphs 3. Connectivity: Euler & Hamilton Paths **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 11	[M, 1, 2, 4]	Lecture, Discussions
13	**Lecture 12** **Tutorial 12**	**Graphs (continue)** **Lecture content** 4. Shortest-Path Problems: Dijkstra's Algorithm **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 12	[M, 1, 2, 4]	Lecture, Discussions
14	**Lecture 13** **Tutorial 13**	**Trees** **Lecture content** 1. Introduction to Trees 2. Tree Traversal 3. Trees Applications **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 13	[M, 1, 2, 4]	Lecture, Discussions
15	**Lecture 14** **Tutorial 14**	**Boolean Algebra** **Lecture content** 1. Boolean Functions 2. Representing Boolean Functions 3. Logic Gates **Tutorial content** ▪ Problem Solving on the topics covered in Lecture 14	[M, 1, 2]	Discussions
16		**REVISION WEEK**		
17-18		**FINAL EXAMINATION WEEK**		

10.0 MATRIX OF LEARNING OUTCOMES

SUBJECT vs PROGRAM OUTCOME (PO)

Subject	PROGRAM OUTCOME (PO)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
DITI 1223	X				X			X

LEARNING OUTCOME (LO) vs PROGRAM OUTCOME (PO)

LO	PROGRAM OUTCOME (PO)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
LO1	X							
LO2					X			
LO3								X

LEARNING OUTCOME (LO)

LO1	Explain the basic concepts and techniques of Discrete Mathematics (C2)
LO2	Apply those concepts and techniques to related theoretical problems (C3, CTPS3)
LO3	Propose solutions to problems in applied computer science with the assistance of an appropriate use of software (A3, LL2)

SUBJECT vs SOFT SKILLS

Subject	SOFT SKILLS																						
	communication skill					critical thinking & problem solving					team work			lifelong learning			entrepreneurship skills			ethics & moral professionalism			leadership skills		
	CS 1	CS 2	CS 3	CS 4	CS 5	CTPS1	CTPS2	CTPS3	CTPS4	CTPS5	TS 1	TS 2	TS 3	LL 1	LL 2	LL 3	ES 1	ES 2	ES 3	EM 1	EM 2	EM 3	LS 1	LS 2	LS 3
DITI 1223								X							X										

LEARNING OUTCOME (LO) vs SOFT SKILLS

LO	SOFT SKILLS																						
	communication skill					critical thinking & problem solving					team work			lifelong learning			entrepreneurship skills			ethics & moral professionalism			leadership skills		
	CS 1	CS 2	CS 3	CS 4	CS 5	CTPS1	CTPS2	CTPS3	CTPS4	CTPS5	TS 1	TS 2	TS 3	LL 1	LL 2	LL 3	ES 1	ES 2	ES 3	EM 1	EM 2	EM 3	LS 1	LS 2	LS 3
LO1																									
LO2								X																	
LO3															X										

SUBJECT vs TAXONOMY

Subject	Taxonomy																
	Affective					Cognitive						Psychomotor					
	A1	A2	A3	A4	A5	C1	C2	C3	C4	C5	C6	P1	P2	P3	P4	P5	P6	P7
DITI 1223			X				X	X										

LEARNING OUTCOME (LO) vs TAXONOMY

LO	Taxonomy																
	Affective					Cognitive						Psychomotor					
	A1	A2	A3	A4	A5	C1	C2	C3	C4	C5	C6	P1	P2	P3	P4	P5	P6	P7
LO1							X											
LO2								X										
LO3			X															

TEACHING PLAN APPROVAL

Prepared by;   Approved by;

………………………………………………………   ……………………………………………………
Name: Dean/Deputy Dean (Academic)/HOD

Stamp: Stamp:

Date: _____   Date: _____

TEACHING PLAN IMPLEMENTATION
(MID SEMESTER BREAK)

Comment :

Checked by;

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Dean/Deputy Dean (Academic)/HOD

Stamp:

                                                Date: _____

TEACHING PLAN IMPLEMENTATION
(WEEK 16)

Comment :

Checked by;

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Dean/Deputy Dean (Academic)/HOD

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