CHAPTER 5

DETAIL OUTLINE OF UNDERGRADUATE COURSES OFFERED BY THE DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LEVEL-1 SPRING TERM

CSE-101: Discrete Mathematics

COURSE INFORMATION										
Course Code : CSE-101				Lecture Cont	act Hour	s :	: 3.00			
Course Title : Discrete Mathematics Credit Hours						::	3.00			
PRE-RE(PRE-REQUISITE									
Course Co	ode: Nil									
Course Tit	tle: Nil					_	_			
CURRICULUM STRUCTURE										
Outcome l	Based Educat	ion (OBE)								
RATION	ALE									
The course	e is designed	to develop logical thinking and	its a	pplication to c	omputer	scienc	e (to e	emphasize the		
importanc	e of provin	g statements correctly and	de-e	mphasize the	hand-w	vaving	appro	bach towards		
correctnes	s of an argun	nent). The subject enhances on	ne's a	ability to reaso	on and at	oility to	o prese	ent a coherent		
and mathe	matically acc	urate argument								
OBJECT	IVE									
1. To ii	ntroduce Disc	rete Mathematics and its applic	atio	ns.						
2. To in	ntroduce som	e of the problems of Discrete	Mat	hematics. To a	levelop 1	knowle	edge o	f a variety of		
math	nematical tool	s applicable in computer science	ce.							
						_	_			
LEARNI	NG OUTCO	MES & GENERIC SKILLS								
	C	ourse Learning Outcome		Bloom's	~~~	~ .		Assessment		
No.	(Upon comp	pletion of the course, the students w	vill	Taxonomy	СР	CA	KP	Methods		
	Dofino an	De able to)	ion	-						
CO1	and determ	ine if the argument is or is	not	$C_{2}C_{3}\Delta_{2}$	1,2		1	T, ASG,		
COI	valid	line if the argument is of is	not	C2-C5,A2			1	Viva		
	Construct	simple mathematical proofs a	and	G2 G2	1		1.0			
CO2	possess the	ability to verify them.		C2,C3	1		1,2	Т		
	Demonstrat	the understanding of so	ets,					Mid Tom		
CO3	relations	and functions and model	ing	C2-C3	1		1-3	F		
	problems using graphs and trees.							Г		
	Develop	the communication skills	by							
CO4	presenting	different topics on graphs a	and	A2		1		Pr		
	trees.									
(CD Complex Disklams CA Complex Activities KD Key 1, 1, 1, D. C. T. T. C. DD, D. S. C.										
Ouiz: ASG Assignment: Pr. Presentation: P. Penort: IT. Lab Tost.										
χ_{ull} ,										
COURSE	COURSE CONTENT									
The Four	ndations of	logic and proofs: Logic Pro	nosi	tional Equival	ence Pi	edicat	es and	1 Quantifiers		
Nested O	Nested Quantifiers, Methods of Proofs; Basic Structures of Sets and Functions: Sets, Set Operations,									
Functions: Algorithms: Algorithms. Integers and Division. Integers and Algorithms.										

Functions; Algorithms: Algorithms, Integers and Division, Integers and Algorithms, Mathematical Reasoning; Induction and Recursion: Mathematical Induction, Mathematical Reasoning, Recursive Definitions and Structural Induction; Counting Methods: Pigeonhole Principle and applications, Advance Counting Techniques, Recurrence Relations; Relations: Properties of Relations, Representing Relations, Equivalence Relations; **Graphs and Trees:** Introduction to Graphs and Trees, graph models, representing graphs and graph isomorphism, Euler and Hamilton Path, Application of trees.

SKILL MAPPING

					PROGRAM OUTCOMES (PO)									
No.	Course Lear	ning Outcome	1	2	3	4	5	6	7	8	9	1	1	$\frac{1}{2}$
	Define an argument using logical													
CO1	notation and deterr	notation and determine if the argument												
	is or is not valid.													
CO2	Construct simple	mathematical proofs		н										
002	and possess the abil	ity to verify them.												
002	Demonstrate the understanding of sets,													
03	relations and functions and modeling				н									
	problems using graphs and trees.													
CO4	presenting differen	it topics on graphs										L		
	and trees.	and trees.										_		
(H – Hig	h, M- Medium, L-lov	w)												
JUSTIF	ICATION FOR CO	-PO MAPPING:												
Mapping	Level				Jus	tifica	ations	s						
CO1-PO	1 High	Be skillful in expre	ssing	g ma	them	atica	l pro	pert	ies	forn	nally	via t	he fo	rmal
	C	language by apply	ing	g the knowledge fundamentals to the solution of										
		complex engineering	g pro	blem	s.									
CO2-PO	2 High	Develop the ability	to ev	valuat	te a p	proof	on t	he t	oasic	stru	actur	e of e	each j	proof
technique described.														
CO3-PO3 High Be able to specify			nd n	nanip	ulate	basi	c ma	the	mati	cal (objec	ts su	ch as	sets,
functions, and relation properties that these			ons a obie	objects possess.									atical	
CO4-PO	10 Low	Develop the com	mun	icatio	on s	ss. skill	thre	məł	c c	lass	par	ticina	tion	and
presentation.					բա	ererpe	uion	una						
TEACHING LEARNING STRATEGY														
Teaching and Learning Activities						Engagement (hours)								
Face-to-I	Face Learning								00			,		
Lecture						42								
Practical / Tutorial / Studio						-								
Student-Centred Learning														
Self-Directed Learning						42								
Revision						42								
Assessment Preparations						21								
Formal Assessment											-			
Continuous Assessment						2								
Final Examination						3								
Total					131									
TEACHING METHODOLOGY														
Lectures, class performance, Quiz, Viva, Lab tests, Report														

1	COURSE SCHEDULE								
	Week	Lecture	Topics	Assessment Methods					
	1	Lec 1	The Foundations: Logic, Propositional						
		Lec 2	Equivalence						
		Lec 3							
	2	Lec 4	The Foundations: Predicates and Quantifiers,						

	Lec 5	Nested Quantifiers	Class Test 1
3	Lec 7	The Foundations: Methods of Proofs	-
5	Lec 8	The Foundations. Methods of Froors	
	Lec 9		
4	Lec 10	The Foundations: Sets Set Operations Functions	
	Lec 11	The Foundations. Sets, Set Operations, Functions	
	Lec 12		
5	Lec 13	The Fundamentals: Algorithms, Integers and	-
	Lec 14	Division	
	Lec 15		
6	Lec 16	The Fundamentals: Integers and Algorithms	Class Test 2
	Lec 17		
	Lec 18		
7	Lec 19	Mathematical Reasoning, Induction and	
	Lec 20	Recursion: Mathematical Induction	
	Lec 21		
8	Lec 22	Mathematical Reasoning, Induction and	
	Lec 23	Recursion: Recursive Definitions and Structural	
	Lec 24	Induction	
9	Lec 25	Counting Methods: Pigeonhole Principle and	
	Lec 26	applications	
	Lec 27		Mid Term Exam
10	Lec 31		
	Lec 32	Relations	
	Lec 33		
11	Lec 28	Relations: Properties of Relations; Representing	
	Lec 29	Relations	
	Lec 30		
12	Lec 34	Relations: Equivalence Relations	
	Lec 35		
	Lec 36		
13	Lec 37	Graphs and Trees: Introduction to Graphs and	
	Lec 38 Trees		Class Test 3
	Lec 39		
14	Lec 40	Boolean Algebra: Boolean Functions,	
	Lec 41	Representing Boolean Functions, Logic Gates	
	Lec 42		

ASSESSMENT STRATEGY

Com	oonents	Grading	СО	Bloom's Taxonomy
Continuous Assessmen t (40%)	Test 1.2	200/	CO1	C1, C2,P3,A1
	Test 1-5	20%	CO2	C2,C3
	Class Participation	5%	CO4	C6,A2
	Mid term	15%	CO3	C2-C4
Final	Exam	60%	CO3	C2-C4
Total	Marks	100%		

(CO = Course Outcome, C = Cognitive Domain, P = Psychomotor Domain, A = Affective Domain) **REFERENCE BOOKS**

Discrete Mathematics and its Applications, 7th Edition by K. Rosen, McGraw Hill.
Discrete Mathematics with Applications, 3rd Edition by Susanna S. Epp Gagne

REFERENCE SITE