MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN													
Department of COMPUTER SCIENCE Engineering & INFORMATION TECHNOLOGY													
Name o	f the Subject	ALGEBRA AND NUMBER TH	IEORY	Name of	the handling Faculty	K.Ramamo	oorthy						
S	Subject Code	MA8551			Year / Sem	III/V	III/V						
	Acad Year	2022-2023			Batch	2019-20	24						
Course Objective													
To deliver the basic notions of groups, rings, fields which will then be used to solve related problems.													
To apply and illustrate the concepts of rings, finite fields and polynomials													
To Summarize the basic concepts in number theory													
To examine the key questions in the Theory of Numbers.													
To relate the integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject													
Course Outcome													
Apply the basic notions of groups, rings, fields which will then be used to solve related problems.													
Classify the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.													
Demonstrate accurate and efficient use of advanced algebraic techniques.													
Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the													
Apply inte	egrated ap	proach to number theory and abstract alge	bra, and provide a fin	rm basis f	for further reading an	d study in the subj	ect.						
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			T / R*	<u>.</u> 	Made of Teaching (DD /			Т					
Sl. No.		Topic(s)		Periods	PPT / NPTEL / MOOC /	Blooms Level (L1-	L6 CO	РО					
			Book	Required	etc)	, , , , , , , , , , , , , , , , , , ,	,						
		UNIT I GROUP	S AND RINGS			12		•					
1	Introduct	tion - Groups : Definition - Properties	Т2	1	Chalk and Board	L1	C01	PO1,PO3					
2	Homomo	rphism	Т2	1	Chalk and Board	L1	C01	PO1,PO3					
3	Isomorph	lism	Τ2	1	Chalk and Board	L1	CO1	PO1,PO3					
4	Cyclic gr	oups	Τ2	1	Chalk and Board	L2	CO1	PO1,PO3					
5	Cosets		Τ2	1	Chalk and Board	L2	CO1	PO1,PO3					
6	Lagrange	's theorem	Τ2	1	Chalk and Board	L2	CO1	PO1,PO3					
7	Rings: De	efinition - Sub rings	Τ2	1	Chalk and Board	L2	CO1	PO1,PO3					
8	Sub Ring	s-Theorems	T2	1	Chalk and Board	L3	CO1	PO1,PO3					
9	Integral d	lomain	T2	1	Chalk and Board	L3	C01	PO1,PO3					
10	Integral d	lomain-Theorem	Τ2	1	Chalk and Board	L3	CO1	PO1,PO3					
11	Field & I	nteger modulo n	R1	1	Chalk and Board	L3	CO1	PO1,PO3					
12	Ring hom	iomorphism.	R1	1	Chalk and Board	L3	CO1	PO1,PO3					
Suggested A	Activity: Ass	signment / Case Studies / Tuorials/ Quiz / Mini	i Projects / Model Deve	loped/other	s Planned if any								
Evaluation	method				10								
	1	FINITE FIELDS AND POLYN	IOMIALS	1	12			DOL DOL D					
13	Rings-Int	roduction	T1	1	Chalk and Board	L1	CO2	03					
14	Ring Poly	nomial	T1	1	Chalk and Board	L1	CO2	PO1,PO2,P					
15	Irreducib	le Polynomial	T1	1	Chalk and Board	L1	CO2	P01,P02,P					
16	Irreducib	le Polynomial-Theorem	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P O3					
17	Irreducib	le Polynomial-problems	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P 03					
18	Irreducib	le Polynomial over finite fields	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P O3					
19	Hexadeci	mal & Octo decimal problems	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P O3					
20	Hexadeci	mal & Octo decimal problems	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P 03					
21	Factoriza	tion of polynomials over finite fields.	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P 03					
22	Factoriza	tion of polynomials over finite fields.	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P 03					
23	Factoriza	tion of polynomials over finite fields.	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P 03					

24	Factorization of polynomials over finite fields- Problems	T1	1	Chalk and Board	L2	CO2	PO1,PO2,P O3						
Suggested A	Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini	Projects / Model Devel	oped/other	s Planned if any		•							
Evaluation	method												
UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 12													
25	Division algorithm	T1	1	Chalk and Board	L1	CO3	PO1,PO2						
26	Base - b representations	T1	1	Chalk and Board	L2	CO3	PO1,PO2						
27	Number patterns	T1	1	Chalk and Board	L3	CO3	PO1,PO2						
28	Prime and composite numbers	T1	1	Chalk and Board	L3	CO3	PO1,PO2						
29	Prime and composite numbers-Theorems	T1	1	Chalk and Board	L2	CO3	PO1,PO2						
30	GCD	T1	1	Chalk and Board	L1	CO3	PO1,PO2						
31	GCD-Problems	T1	1	Chalk and Board	L3	CO3	PO1,PO2						
32	Euclidean algorithm	T1	1	Chalk and Board	L2	CO3	PO1,PO2						
33	Euclidean algorithm-Problems	T1	1	Chalk and Board	L2	CO3	PO1,PO2						
34	Fundamental theorem of arithmetic	R2	1	Chalk and Board	L2	CO3	PO1,PO2						
35	LCM	R2	1	Chalk and Board	L1	CO3	PO1,PO2						
36	LCM-Problems	R2	1	Chalk and Board	L3	CO3	PO1,PO2						
Suggested A	gested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any												
Evaluation	method												
UNIT IV	UNIT IV DIOPHANTINE EQUATIONS AND CONGRUENCES 12												
37	Linear Diophantine equations	T1	1	Chalk and Board	L1	CO4	PO1,PO2						
38	Linear Diophantine equations-Problems	T1	1	Chalk and Board	L1	CO4	PO1,PO2						
39	Congruence's	T1	1	Chalk and Board	L1	CO4	PO1,PO2						
40	Linear Congruence's	T1	1	Chalk and Board	L2	CO4	PO1,PO2						
41	Linear Congruence's	T1	1	Chalk and Board	L2	CO4	PO1,PO2						
42	Applications: Divisibility tests	T1	1	Chalk and Board	L3	CO4	PO1,PO2						
43	Applications: Divisibility tests	T1	1	Chalk and Board	L3	CO4	PO1,PO2						
44	Modular exponentiation	T1	1	Chalk and Board	L3	CO4	PO1,PO2						
45	Chinese remainder theorem	hinese remainder theorem T1		Chalk and Board	L2	CO4	PO1,PO2						
46	Chinese remainder theorem-PROBLEMS	R2	1	Chalk and Board	L3	CO4	PO1,PO2						
47	2 x 2 linear systems	R2	1	Chalk and Board	L2	CO4	PO1,PO2						
48	2 x 2 linear systems-Problems	R2	1	Chalk and Board	L3	CO4	PO1,PO2						
Suggested A	Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini	i Projects / Model Devel	oped/other	s Planned if any									
Evaluation	method												
UNITV	CLASSICAL THEOREMS AND MU		FUNCTIO		T 4	1	1						
49	Wilson's theorem	11 T1	1	Chalk and Board									
50	Wilson's theorem-PROBLEMS	11 T1	1	Chalk and Board	L2								
51	Wilson's theorem-PROBLEMS	11 T1	1	Chalk and Board	L3								
52	Fermat's little theorem	11 T1		Chalk and Board									
53	Fermat's nue theorem-PROBLEMS	11 T1		Chalk and Board	L3								
54	Euler's theorem	11 T1		Chalk and Board									
55	Euler's theorem-PROBLEMS	11 T1		Chalk and Board	L3								
56	Euler's theorem-PROBLEMS	11 T1		Chalk and Board	L3								
5/	Euler's Phi functions	11 T1		Chalk and Board	L2								
58	Euler's Phi functions-PROBLEMS	11 T1	1	Chalk and Board	L3								
59	Tau and Sigma functions	11 T1		Chalk and Board	L2								
60 Suggested	1 au and Sigma functions-Problems	II Projects / Model Devel	I I	Diank and Board	L3								
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any													
Content Revond the Syllabus Planned													
2													
	Text Books												
1	Grimaldi, R.P and Ramana, B.V., "Discrete and Combina	torial Mathematics", P	earson Edu	cation, 5th Edition, Nev	v Delhi, 2007.								
2	Koshy, T., —Elementary Number Theory with ApplicationsI, Elsevier Publications, New Delhi, 2002.												
3													
Reference Books													
1 Lidl, R. and Pitz, G, "Applied Abstract Algebra", Springer Verlag, New Delhi, 2nd Edition, 2006.													

2	Niven, I., Zuckerman.H.S., and Montgomery, H.L., —An Introduction to Theory of Numbersl, John Wiley and Sons, Singapore, 2004.													
3	San Ling and Chaoping Xing, —Coding Theory – A first Coursel, Cambridge Publications, Cambridge, 2004.													
	Website / URL References													
1	https://onlinecourses.nptel.ac.in													
2														
3														
Blooms Level														
Level 1 (L1): Remembering Lower						Fixed	Fixed Level 4 (L4) : Analysing							Projects /
	Level 2 (L2): Under	rstanding		Order	Hour Level 5 (L5) : Evaluating							Order	Mini Projects
Level 3 (L3) : Applying Thinking					Exams	Exams Level 6 (L6) : Creating								
Mapping syllabus with Bloom's Taxonomy LOT and HOT												LOT	HOT	
Uni		CDOUDC						L3	L4		Lo	LOI	HOI	lotal
		GROUPS	AND KIN		OMIALC	0	0	0	0	0	0	0	0	0
	hit 2	FINITEF	IELDS AN	D POLYN	OMIALS	0	0	0	0	0	0	0	0	0
	nit 3	DIVISIBI	LITY THE	ORY AND		0	0	0	0	0	0	0	0	0
Un	nit 4	DIOPHA	NTINE EQ	QUATION	S AND	0	0	0	0	0	0	0	0	0
Unit 5 CLASSICAL THEOREMS AND						0	0	0	0	0	0	0	0	0
Total						0	0	0	0	0	0	0	0	0
Total Percentage							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
CO PO Mapping											POIL			
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	POII	PO12	PSO1	PSO2
<u>C01</u>	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-	-	-
Avg	3	3	2	-	-	-	-	-	-	-	-	-	-	-
	1					Justificatio	n for CO-P	O mapping						
CO1	CO1 Summarize the notations and properties of algebraic structures such as groups, rings and fields.													
CO2	Explain t	he concep	ts of finite	e fields an	d polynom	ials to sol	ve probler	ns in adva	anced alge	ebra.				
CO3	CO3 Associate the applications of divisibility theory and canonical decompositions.													
CO4	CO4 Describe the concept of Diophantine equations and congruences and exhibit the efficient use of advanced algebraic techniques in number												in numbe	
CO5	Extend the	ne concept	s of multi	plicative f	unctions a	nd classic	al theoren	15.						
CO6 Associate the knowledge of integrated approach to Number theory and abstract algebra														
3 High level 2 Moderate level 1 Low level														
Name & S	ign of Facu	Ity Incharge	:K.RAMA	MOORTH	Y									
Hand of the	a Domontors	ect Expert	:											
Head of the Department :														

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