B.C.A

Subj	ject Code	Subject Name	Category	L	T	P	S	Credits		Mark	S
									CIA	Externa	l Total
231	BCAA1	DIGITAL LOGIC	Elective	3	-	-	-	3	25	75	100
		FUNDAMENTALS	Course 1								
			urse Objecti								
(C O 1	To introduce the fundament	ntals of numbe	r sys	ste	ms a	ind ?	Digital lo	gic.		
(C O2	To understand Boolean al	gebra, convers	ions	an	d Bi	inar	y arithme	tic ope	rations.	
(C O3	To get exposure to combine	national logic o	ircu	its						
(C O4	To understand the concept	t of sequential	logic	e a	nd f	lipfl	ops			
(C O5	To study the design of cou	inters and unde	ersta	nd	the	mei	nory type	es.		
			Cont	ents							No. of
]	Hours
U		NUMBER SYSTEMS A									
		Number Systems and Co									
		Codes – Code Conversion	on. Digital Lo	ogic:	L	ogi	c G	ates – T	ruth T	ables –	15
		Universal Gates.									
UN	UNIT II BOOLEAN ALGEBRA										
	Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification										15
	of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations										
			,						-		
TIN		of Binary Numbers – Ariti		g Bi	OC.	KS –	Aa	aer – Sub	tractor		
UN		COMBINATIONAL LO			+:	1		Dagadam	a Ema	and and	
		Combinational Logic: Mu Code Converters – Parity	-		-			Decoder	s – enc	coders –	15
TIN		SEQUENTIAL LOGIC	Generators and	ı Cıı	CCI	1015.	•				13
UIV		Sequential Logic: RS, Jk	Z D and T F	lin_l	F1a	ne	M	[acter_Sla	ve Fli	n_Flone	15
		Registers: Shift Registers		-		-		iasici-bia	ve rnj	J-1 lops.	13
IIN		COUNTERS AND MEM		.11 111	<u> </u>	5001	J.				15
O1		Counters: Asynchronous a		us C	or.	ınteı	·s -	Rinnle. M	lod. Ui	n-Down	13
		Counters— Ring Counters.	•					11		L .	
		– Types of RAMs.) F		
		7.1						7	Total 1	Hours	75
		Course	Outcome							amme O	
CO	On com	pletion of this course, stu									
1	Identify t	he logic gates and their fur	nctionality.						PC	01, PO3,F	PO5
2		number conversions from		anotl	ner	sys	tem			PO3, PO	
3		nd the functions of combin							PC	3, PO4, 1	PO7
4	Perform 1	number conversions.							PC	04, PO5, 1	PO6
5	Perform (Counter design and learn it	ts operations.							PO7, PO	
-			Text Boo								
1	D.P.Leac	h and A.P.Malvino, Digita	l Principles an	d A	opl	icat	ions	- TMH -	- Fifth	Edition –	2002.
			Reference Books								
1.	V.Rajara	man and T.Radhakrishnan		uter	D	esig	n, P	rentice H	[all of]	India, 200	1
2.		Mano, Digital Logic and									
		ee, Digital Computer Fund							Iill, 19	91.	
	1										

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	S	S	S	M	S	M
CO2	S	S	S	M	S	S	M	S
CO3	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S

 $\begin{array}{l} PO-Programme~Outcome,~CO-Course~outcome\\ S-Strong,~M-Medium,~L-Low \end{array}$

	Subject	Subject Name	Category	L	T	P	S	Credits	Marks		
	Code								CIA	External	Total
Ī	23BCAAP1	Digital Principles &	Allied Lab	-	-	2	-	2	25	75	100
		Computer									
		Organization -LAB									

Course Objectives:

- 1. To Understand the Digital Electronics Practically
- 2. To know how to solve gates and other functions.
- 3. To create Boolean laws.
- 4. Be able to work with flip-flops.
- 5. Be able to build multiplexer and de-multiplexer.

LAB EXERCISÉS	Required						
	Hours						
AND, ORand NOT Gateusing Truth Table	60						
UniversalityofNAND&NORgates.							
Verification							
ofBooleanlawsusingNANDgates (AssociativeCommutative&DistributiveLaws)							
VerifyDe-Morganstheorem							
VerificationofBooleanlawsusingNORgates(Associative,Commutative&DistributiveLaws)							
SumofProductsusingNANDgatesandProductofSums usingNORGates.							
4-bitbinaryparalleladderandSubtractorIC7483							
CounterusingIC7473							
StudyofRS,D,TandJKFlip-FlopswithIC's.							
StudyofEncoder&Decoder.							
StudyofMultiplexer&De-Multiplexer.							
Half and Full AdderusingSimple&NANDGates.							
HalfandFullSubtractorusingSimple&NANDGates.							
Course Outcomes							
On completion of this course, students will							
CO1 Demonstrate the understanding of digital electronics							
CO2 Identify the problem and solve using gates and other functions.	O2 Identify the problem and solve using gates and other functions.						
CO3 Identify suitable programming Boolean laws.							
CO4 Learners can be work with flip-flops.							
CO5 Develop multiplexer and de-multiplexer.	Develop multiplexer and de-multiplexer.						

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	2
CO2	2	1	3	2	-	2
CO3	3	3	1	1	1	2
CO4	2	3	3	1	-	1
CO5	3	2	3	1	1	-
Weightage of course contributed to each PSO	12	11	12	7	5	7

S-Strong-3 M-Medium-2 L-Low-1

		C 4	_	T	_		G I'	Inst.		Marks	ks	
Subject C	ode Subject Name	Category	L	T	P	3	Credits	Hours	CIA	Externa	l Total	
23BCAA	Resource Managem Techniques	Allied	3	-	-	-	3	3	25	75	100	
		Cours	e Ob	jecti	ve							
CO 1	Describe the fundam	nental concepts	of op	erati	ons	rese	earch and	linear p	rogra	mming co	ncepts.	
CO 2	Understand the math											
CO 3	Describe the concep		nt pro	obler	n an	d as	ssignmen	t proble	m.			
CO 4	Classify the sequence	ing problems.										
CO 5	Demonstrate the use	of network sch	eduli	ing b	y PE	ERT	T/CPM.					
			Det	ails							No. of Hours	
UNIT I Basics of Operations Research: Introduction – Scope of Operations Research – Phases of Operations Research -Linear Programming: Introduction – Formulation of LP Problems – Graphical Method: Procedure for Solving LPP by Graphical Method.								6				
UNIT I	Transportation Problem: Introduction – Mathematical Formulation – 6 Definitions – Optimal Solution – North-West Corner Rule – Least Cost or Matrix Minima Method – Vogel's Approximation Method – Optimality Test – MODI Method.									6		
UNIT III								6				
UNIT IV Sequencing Problems: Introduction – Definition – Terminology and Notations – Principal Assumptions – Type I: Problems with n Jobs through Two Machines – Type II: Processing n Jobs through Three Machines A, B, C – Type III: Problems with n Jobs and k Machines – Type IV: Problems with 2 Jobs through k Machines.						ines – blems	6					
UNIT V										8		
			ction	Intro	oduc Juml	tion	ing the E		- Cor	nmon	6	
	Errors - Rules of N	etwork Constru	ction	Intro	oduc Juml	tion	ing the E		- Cor	nmon rson's	6	
	Errors - Rules of N	etwork Constru	ctior h Me	Intro 1 - N thod	oduc Juml	tion	ing the E		- Cor	mmon rson's Total Progra	30 mme	
	Errors - Rules of N Rule) - Time Analysi	etwork Construis – Critical Patl	nction h Me	Intro n - N thod	oduc Juml (CP	tion beri	ing the E		- Cor	mmon rson's	30 mme	
CO CO 1	Errors - Rules of N Rule) - Time Analysi Upon completion of the Remember the fundamer	etwork Construis – Critical Path Course Ouccourse the stude	nctior h Me	Intro n - N thod nes	oduc Numl (CP	tion beri M)	le to:	Events (- Cor Fulker	mmon rson's Total Progra	30 mme	
СО	Upon completion of the Remember the fundamer programming concepts.	Course Ou course the stude ntal concepts of	n Me	Intro n - N thod nes would	oduc Juml (CP	tion berri M)	le to:	Events (- Cor Fulker	mmon rson's Total Progra Outco	30 mme	
CO CO 1	Upon completion of the Remember the fundamental programming concepts. Understand the mathema	Course Ou course the stude ntal concepts of	ents vo	Intro n - N thod nes voulcation	oduc Numl (CP	tion berri M) Abl	le to: test.	near	- Cor Fulker	Total Progra Outco	30 mme ome	
CO 1	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of train	Course Ou course the stude ntal concepts of atical formulationshipment proble	ents vo	Intro n - N thod nes voulcation	oduc Numl (CP	tion berri M) Abl	le to: test.	near	- Cor Fulker	Total Progra Outco	30 mme ome	
CO 2 CO 3	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of tran Analyze the sequencing	Course Ou course the stude ntal concepts of ntical formulationshipment problems.	ents voperant	Intro n - N thod nes voulcation d opt	Juml (CP	Abbasean	le to: rch and li test.	near	- Cor Fulker	Total Progra Outco	30 mme ome	
CO 2 CO 3 CO 4	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of train	Course Ou course the stude ntal concepts of ntical formulationshipment problems. etwork schedulir	ents voperant	Intro n - N thod nes would ation d opt	Juml (CP	Abbasean	le to: rch and li test.	near	- Cor Fulker	Total Progra Outco PO1, PO6 PO2 PO4, PO7	30 mme ome	
CO 2 CO 3 CO 4	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of tran Analyze the sequencing	Course Ou course the stude ntal concepts of atical formulationshipment problems. etwork schedulin	ents von and lem a	Intro 1 - N thod nes vould ation d opt and a	oduc Juml (CP	Ablasean	le to: rch and litest. ent proble	near	- Cor	Total Progra Outco PO1, PO6 PO2 PO4, PO7 PO6 PO7, PO	30 mme ome	
CO 2 CO 3 CO 4 CO 5	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of transplant the sequencing Understand the use of new S.D. Sharma, Operations Co – 1997.	Course Ou course the stude ntal concepts of atical formulationshipment problems. etwork scheduling Te s Research (The	ents von and lem a lem a lem syst Boory, I	Intro n - N thod nes vould ation d opt and a PEF ook Meth	oduc Juml (CP 1 be ss res imal sssign CRT/C od &	Ablasean	le to: rch and li test. ent proble	near	- Cor Fulker	Total Progra Outco PO1, PO6 PO4, PO7 PO6 PO7, PO ath Ram 1	30 mme ome 7 8 Nath &	
CO 2 CO 3 CO 4 CO 5	Upon completion of the Remember the fundamer programming concepts. Understand the mathema Apply the concept of tran Analyze the sequencing Understand the use of ne	Course Ou course the stude ntal concepts of ntical formulationshipment problems. etwork scheduling Te s Research (Thee	ents voperandem and by the true of true of true of the true of tru	Intro n - N thod nes vould ation d opt and a PEF ook Meth	oduc Juml (CP l be s res imal ssign CT/C od &	Ablasean	le to: test. ent proble pplication	near em ducatio	- Cor Fulker	Total Progra Outco PO1, PO6 PO2 PO4, PO7 PO6 PO7, PO ath Ram	30 mme ome 7 8 Nath &	

	Web Resources
1.	https://www.mooc-list.com/tags/operations-research

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	_	_	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2L-Low-1

	_			_					Inst.		Marks	
Co	de	Subject Name	Category	L	T	P	S	Credits	1	CIA	External	Total
23BC	CAAP2	Resource Management Techniques Lab (Using C/C++/Python)	Allied Lab	ı	-	2	-	2	2	25	75	100
	1		Course	Ob	ject	ive			I.			-
CO1	Descr	ibe the linear programming	model.		•							
CO2	Under	estand the basic function of	drawing th	e fea	asibl	e reg	gion.					
CO3	Descr	ibe the concept of north we	st corner ru	ıle.								
CO4		fy the Vogel's approximation										
CO5	Demo	nstrate the job sequencing p	oroblem an	d ne	twoi	k sc	hedu	lling by P	ERT/C	PM.		
S. No List of Lab Programs										No. of H	ours	
1		program to formulate the I									30	
2	Write a	Program to represent the fe	easible regi	ion g	grapl	nical	ly					
3	Write a	program to Implement the	North-We	st C	ornei	Ru	le					
4	Write a	program to implement the	Vogel's A	ppro	xim	ation	me1	thod				
5		program to implement the										
6		program to implement the										
7		program to implement Job										
8	Write a	program to implement the	Network S	che	dulin	g by	PEI	RT/CPM				
		Cour	se Outcom	ies							Progran	
CO	Upon	completion of the course th	e students	wou	ıld be	e abl	e to:					
CO1	Reme	mber the linear programmir	ng model.								PO1, PO	5
CO 2	Under	stand the programming bas	ic function	of o	lraw	ing t	he fe	easible re	gion		PO2	
CO 3		the programming concept									PO4, PO	7
CO 4		ze the Vogel's approximati									PO6	
CO 5	Know	the job sequencing probler				duliı	ng by	y PERT/C	CPM.		PO7, PO8	3
			Te	xt B	ook							
1	S.D. Sł 1997.	narma, Operations Research	(Theory, I	Metl	nod &	& Ap	plic	ations) - 1	Kedar N	Nath R	am Nath &	c Co –
	•		Refere	nce	Boo	ks						
		A. Taha, Operations Resea										
	Frederi	ck S. Hillier, Gerald J. Lieb McGraw Hill, 2021										
	1	,	Web 1	Resc	ourc	es						
1.	https:/	//www.mooc-list.com/tags/d	perations-	rese	arch							

1714	ping with	i i i ugi ai	iiiie Out	comes.		
CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course						
contributed to each PSO	12	9	6	5	6	4

Illustration for B.C.A. Allied Paper II Year – Semester – III & IV

Subject								Inst.		Marks		
Subject Code	Subject Name	Category	L	T	P	S	Credits	Hours	CIA	External	Total	
23BCAA3	Discrete Mathematics	Allied	3	-	-	1	3	3	25	75	100	
	Course Objective Describe the fundamental concepts of set theory, functions and relations.											
CO 1	Describe the fundamental c	concepts of s	et the	eory,	fun	ctio	ons and re	lations.	•			
CO 2	Understand the mathemat Statements.									and Com	pound	
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference.											
CO 4	Classify the insights of graph theory.											
CO 5	Demonstrate the trees and Boolean algebra.											
UNIT]	Detai	ls							o. of ours	
UNIT I	Fundamental Structures:- Set Theory, Sets, Venn Diagrams, Complements, Cartesian Products, Power Sets, Finite and Infinite Sets. Functions:- Surjections, Injections, Inverses, Composition. Relations:- Reflexivity, Symmetry, Transitivity, Equivalence Relations.								ments,	6		
UNIT II	Logic:- TF Statements, Co Bi Conditional Statement Formulae, The Truth Tab Distinct Truth Tables.	ts, Atomic le, Tautolog	and gy, T	Cor `auto	npoi logi	und cal	Stateme Implicat	ents, W ion For	Vell formulae	ormed with	6	
UNIT III	Normal Forms:- Princip Statements, Quantifiers, V Predicate Calculus.						•			-	6	
UNIT IV	Graph Theory:- Definition Bipartite Graph – Represer								olete (Graph,	6	
UNIT V	Trees: Spanning Tree - Algorithm, Boolean Algeb	- Kruskal's	Alg	gorith	ım,	Pr	im's Alg	gorithm	, Dijk	stra's	6	
									T	otal	30	
		Course O	utco	mes						Prograi Outco		
CO	Upon completion of the cou											
CO 1	Remember the fundamental									PO1, PO	6	
CO 2	Understand the mathematic and Compound Statements.									PO2		
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference. PO4, PO7										7	
CO 4	Analyze and Classify the in		-		7.					PO6	\ <u>\</u>	
CO 5	Understand the use trees and		_							PO7, PC	98	
			xt Bo									
1	Jean-Paul Trembly & Mand			Discr	ete I	Ma	thematics	Structi	ures w	rith Applic	ations	
	to Computer Science. Tata M	Mc Graw-Hi	III.									

	Reference Books							
1.	Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). Discrete Mathematics.							
	National Publishing co.							
	Web Resources							
1.	https://mathworld.wolfram.com/DiscreteMathematics.html							

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	_	_	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2L-Low-1

C 1	C 1. AN	C 4	т	Т	n	C	C 114	Inst.		Marks				
Code	Subject Name	Category	L	T	P	S	Credits	Hours	CIA	External	Total			
23BCAAP3	Excel & C++ Lab for Discrete Mathematics	Allied Lab	-	-	2	-	2	2	25	75	100			
		Cours	e O	bjec	tive		1		'					
	To impart the knowledge al						ns							
CO2	Understand and create trut													
CO3	Understand and create spr		or de	emoi	gan'	s the	eorem.							
CO4	Classify the various set op		1	••										
CO5	Demonstrate and impleme									N CH				
S. No		List of Lab								No. of Hours				
1	Create a truth table using									30				
2	Create a truth table using spreadsheet's AND, OR, a	•							•					
3	Create a truth table, using expression: $((P \land 7Q) \lor (7))$	ng your sp P∧Q).	reac	lshee	et's l	ogic	al functi	ons, for						
4	Create a truth table using	your spread	lshee	et for	den	norg	an's theo	rem.						
5	Create a truth table using spreadsheet to check whether the given expression is tautology or not $(P \land Q) \lor (7P \land Q) \lor (P \land 7Q) \lor (7P \land 7Q)$													
6	Write a C++ Program intersection, difference, sy	to implen	nent	vai	ious				nion,					
7	Write a C++ Program to find power set of a set with size n.													
8	Write a C++ program to perform following operation: a) is the given relation is reflexive?b) is the given relation is symmetric? c) is the given relation is Transitive?													
9	Write C++ Program to im							114115101						
10	Write a C++ Program to c	heck wheth	er a	give	n gr	aph	is biparti	te or not						
	Cour	se Outcon	nes							Program Outcom				
CO	Upon completion of the co	ourse the st	uder	its w	ould	be a	able to:							
CO1	Remember the truth table									PO1, PO6)			
CO 2	Understand the programm Logical problems.	ing basic ft	ıncti	ion a	nd k	now	ledge abo	out solvi	ing	PO2				
CO 3	Apply the programming continuous theorem.	oncept of sp	orea	dshe	ets fo	or de	emorgan'	S		PO4, PO7				
CO 4	Analyze the various set op	erations an	d pr	oble	m.					PO6				
CO 5	Know to demonstrate and	implement	prin	n's a	lgori	thm	s			PO7, PO8				
		Te	ext I	Book										
1	Jean-Paul Trembly & Applications to Computer	-						1athema	tics	Structures	with			
	· · · · · · · · · · · · · · · · · · ·	Refer	ence	e Bo	oks									
1.	Venkataraman, M.K., Sridh National Publishing co.	aran, N., &	Ch	andr	asek	aran	, N. (200	9). <i>Disc</i>	rete N	1athematic	<i>S</i> .			
_		Web	Res	our	es									
1.	https://mathworld.wolfran	n.com/Disc	retel	Math	ema	tics.	<u>html</u>							

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	_	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course						
contributed to each PSO	12	9	6	5	6	4

Strong-3 M-Medium-2 L-Low-1

Subject								Ingt		Marks	
Subject Code	Subject Name	Category	L	Т	P	S	Credits	Inst. Hours	CIA	External	Total
23BCAA4	STATISTICS METHODS AND ITS APPLICATIONS	Allied	3	-	-	-	3	3	25	75	100
		Cours	e Ob	jecti	ve						
CO 1	Describe the fundamental co	oncepts of c	ollec	ting	and	pre	esenting s	tatistica	ıl data.		
CO 2	Understand the measures of										
CO 3	Describe the concept and M	leasures of	Skew	ness	, Ku	rto	sis and M	loments	5.		
CO 4	Classify the insights of corr	elation and	Cond	curre	nt de	evi	ation met	hod.			
CO 5	Demonstrate the regression										
UNIT	Details									lo. of lours	
UNIT I	Collection and Presentation of Statistical Data: Nature, Scope and Limitations of Statistics – Data sources – Methods of collection of statistical data – Census – Sample Survey – Measurement of Scales – Nominal, Ordinal, Interval and Ratio scales – Classification and Tabulation – Formation of frequency distribution – Cumulative frequency distribution – Diagrammatic and Graphical representation of Data.							sus – Ratio ion –	6		
UNIT II	Measures of Central Te Mode, Geometric mean and – Quartiles, Deciles and Pe – Range – Quartile deviation of Variation – Lorenz Curve	l Harmonic rcentiles – A on – Mean	mea Abso	n for lute	raw	ar rela	nd groupe ative mea	ed data - sures of	– Prop f Disp	erties ersion	6
UNIT III	Measures of Skewness, Kurtosis and Moments: Definition – Calculation of Karl Pearson's, Bowley's and Kelly's coefficient of Skewness – Moments – Raw and Central Moments – Relation between raw and central moments – Measures of Skewness and Kurtosis 15 based on Moments.								w and	6	
UNIT IV	Correlation: Definition of Correlation – Types of correlation – Methods of correlation – Scatter diagram – Karl Pearson's correlation coefficient – Spearman's rank correlation coefficient – Properties – Concurrent deviation method – Correlation coefficient for ungrouped and grouped bivariate data.								man's	6	
UNIT V	Regression: Meaning of Regression – Regression lines – Regression coefficients – Regression coefficients for ungrouped and grouped bivariate data – Properties of regression coefficient – Finding the two regression equations of X on Y and Yon X and estimating the unknown values of X and Y.								ies of Yon X	6	
									T	otal	30

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of collecting and presenting statistical	PO1, PO6
	data.	
CO 2	Understand the measures of central tendency and dispersion.	PO2
CO 3	Describe the concept and and Measures of Skewness, Kurtosis and Moments.	PO4, PO7
CO 4	Analyze the correlation and Concurrent deviation method.	PO6
CO 5	Understand the use of regression.	PO7, PO8

	Text Book
1	Gupta S. P (2002), Statistical Methods, Sultan Chand and Sons, New Delhi.
2	Gupta S. C and Kapoor V. K, Fundamentals of Mathematical Statistics, Sultan Chand and
	Sons, New Delhi.
3	Goon A. M, Gupta M. K and Dasgupta B (2008), Fundamentals of Statistics, (Vol I), World
	Press Ltd, Calcutta.
4	Bhat B. R, Srivenkataramana T and Madhava Rao K. S (1996), Statistics a Beginner's Text,
	(Vol. – I), New Age International Publishers, New Delhi.
	Reference Books
1.	Hogg R. V and Craig A. T (2006), Introduction to Mathematical Statistics, MacMillan,
	London
2	Saxena H. C, Elementary Statistics, Sultan Chand and Sons, New Delhi.
3	Sancheti D. C and V.K Kapoor, Statistics, Sultan Chand and Sons, New Delhi.
4	Agarwal B. L (1996), Basic Statistics (Third Edition), New Age International Publishers, New
	Delhi.
	Web Resources
1.	https://www.tutorialspoint.com/statistics/data_collection.htm
2	https://www.surveysystem.com/correlation.htm
3	https://www.investopedia.com/terms/r/regression.asp
4	https://course-notes.org/statistics/sampling_theory

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

Strong-3 M-Medium-2 L-Low-1

C 1	Cl. 'AN	C-4	T	T	n	C	C 1''	Inst.		Marks	
Code	Subject Name	Category	L	T	P	S	Credits	!	CIA	External	Total
23BCAAP4	Computer-Oriented Statistical Methods Lab	Allied Lab	-	-	2	1	2	2	25	75	100
		Cours									
CO1	To introduce basic statist						sis of sig	nificano	e dif	ferences in	data
	using C++ programming I										
CO2	To introduce various statis					ress	ion, Skev	vness, e	tc.		
CO3	Understand and perform co		oeff	icier	ıt.						
CO4	Classify the linear regressi										
CO5	Demonstrate and compute										
S. No		List of Lab		_						No. of H	ours
1	Write a C++ program to ex									30	
2	Write a C++ program to							e operat	tions		
	addition, inverse, transpos										
3	Write a C++ program to	Execute th	e st	atisti	cal f	unc	tions: me	an, med	dian,		
	mode.										
4	Write a C++ program		e tl	he s	tatis	tical	function	ns: Sta	ndard		
_	Deviation, variance, and co										
5	Write a C++ program to di										
6	Write a C++ program to ol										
7	Write a C++ program to p	pertorm the	e bir	ıomı	al ar	id no	ormal dis	tributio	n on		
0	the data.	C .1	т .								
8	Write a C++ program to Perform the Linear Regression. Write a C++ program to Compute the Least squares means.										
9											
10	Write a C++ program to C			ılti R	legre	ssio	n.				
		rse Outcon								Program Outcom	
CO	Upon completion of the co										
CO1	Students will able to under									PO1, PO6	<u> </u>
CO 2	Students will able to progr			<u> </u>	catio	n of	Statistica	l metho	ds	PO2	
CO 3	Apply and perform correla	tion coeffic	cien	t.						PO4, PO7	7
CO 4	Analyze the various linear		pro	gram	۱.					PO6	
CO 5	Know to compute multi re									PO7, PO8	}
				Book							
	Goyal, M. (2008). <i>Compute</i> Ltd.	r-based Nu	ımer	ical	& St	atisi	tical Tech	ıniques.	Laxn	ni Publicati	ons,
	Gupta, S. C., & Kapoor, V. & Sons.	K. (2020).	Fun	dam	enta	ls of	Mathemo	atical. S	Sultan	Chand stat	istics
		Refer	ence	e Bo	oks						
	Walpole, R. E., Myers, R. F Engineers and Scientists (V							bability	and	Statistics fo	or
	<u> </u>	Web									
1.	https://www.tutorialspoint.c	com/statisti	cs/d	ata_	colle	ction	ı.htm				
2	https://www.surveysystem.o	com/correla	atior	ı.htm	1						

Subject	Subject Name	Category	L	T	P	S	Credits	Inst.		Marks	
Code	Ů							Hours	CIA	Externa	l Total
23BCAA	Graph Theory and its Applications	EC - 4 Allied	3	-	-	-	3	3	25	75	100
	I			ng O							
LO1	Definition of Graph, su	b graph thei	r rep	reser	ntatio	ns,	degree and	d algebra	ic oper	ations.	
LO2	Connected graphs, weigh	ghted graphs	and	shor	test	path	ıS				
LO3	Trees: Characterization	s, spanning	tree,	mini	mun	ı spa	anning tre	es			
LO4	Eulerian and Hamiltoni	an graphs: (Chara	cteri	zatio	n, N	Necessary	and suffi	cient c	onditions	
LO5	Special classes of graph	s: Bipartite	grap	hs, li	ine g	rapl	ıs, chordal	graphs.			
UNIT	Contents										No. of Hours
UNIT I	paths, Circuits connection: Trees	tedness- Co	ompo	onent	s- E	ulei	Graphs-	Hamilto	onian p	paths and	15
UNIT II	cut set- All cut sets -cc 2-Isomorphism- Comb	CONNECTIVITY AND PLANARITY: Introduction to circuits - cut set- properties of cut set- All cut sets —connectivity and separability — Network Flows - 1-Isomorphism - 2-Isomorphism - Combinatorial and Geometric graphs- Planar Graphs — Different representation of planar graph.									
UNIT III	COLORING AND DIRECTED GRAPH: Basics of Colouring & Chromatic number – Chromatic partitioning – Graph Colouring – four colour Problem Chromatic polynomial - Matching – Covering - Directed graphs - Types of Directed Graphs – Diagraphs and binary relations – Directed paths- Euler Graph.									15	
UNIT IV	matrix represed graphs& Quotient Gra definitions and example construct Spanning To Algorithm & Kruskal's	NTATION phs, Transites), spanninges, Weigh	IN o tive g Tre	GRA Clos es o	PH: ure of f Co	ligra nnec	aph, Euler cted Relati	's Path ons, Prin	& Circ n's Alg	cuit (only gorithm to	15
UNIT V	APPLICATIONS OF Un directed Graph, - Omany Cities with directed Components.	GRAPH: Graph with	n ve	rtices	and	l k o	colours- S	hortest p	ath fro	om one to	15
				Tot	tal					1	75
		Course C	utco	mes						1	gramme itcome
	On completion of this cou										
	To Introduce the fundame Suler graphs, Hamiltonian					•		- 1	-	ks, PO1	,PO6
CO2 L	Inderstanding the conceptions and Combin	ots of Circui	ts, C	ut se	et an	d its				ws, PO2	
N	Applying the concept of Matching, Covering Patter	rn and Euler	Gra	phs.					-	PO2	,PO4
K	Analyzing the Various Co Cruskals and Prims Algor	ithms, Conn	ecte	d Co	mpo	nent	s.			t, PO4	,PO6
A	mplementation of an appl applications with travelling a Graph and Shortest Pa	ng sales pers	on P	roble	em, I	C co	lour Probl	em with	n verti	ces PO5	,PO6

	Graphs.							
	Text Book							
1	Narsingh Deo, "Graph Theory with Application to Engineering and Computer Science" Prentice							
	Hall of India 2010(Reprint)							
2	Rosen H "Discrete Mathematics and Its Application " Mc Graw Hill, 2007							
	Reference Books							
1.	Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker							
2.	Clark J and Holton DA "First look at Graph Theory" Allied Publishers 1995							
	Web Resources							
1.	Web resources from NDL Library, E-content from open source libraries							
2.	1) https://d3gt.com/ 2) https://www.coursera.org/courses?query=graph%20theory							

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Subject	Subject Name	Category	L	T	P	S	Credits	Inst.		Mark	S	
Code	· ·							Hours	CIA	Extern	al	Total
23BCAAP	5 Graph Theory and	EC – 5	_	-	2	-	2	2	25	75		100
	its applications Lab	Allied								73		100
		L	earn	ing (Objec	ctive	S					
LO1	Definition of Graph,	sub graph t	heir 1	epre	senta	tions	s, degree a	nd algeb	raic op	erations.		
LO2	Connected graphs, w	eighted gra	phs a	nd sl	orte	st pa	ths					
LO3	Special classes of gr				•				s.			
LO4	Trees: Characterizati											
LO5	Eulerian and Hamilte	onian graphs	s: Ch				Necessar	y and su	fficient	conditio		
Sl. No.					etails							No. of Hours
1	Write a Program to		numb	er o	f vei	rtices	s, even ve	ertices, o	odd ver	tices an	d	
	number of edges in a											60
2	Write a Program to	find connec	ctivit	y in	a gra	iph b	etween tv	vo vertic	es is d	irected o	r	
	indirected.		2.1									
3	Write a program to f											
4	Write a Program to I											
5	Write a Program to I											
6	Write a Program to f											
7	Write a Program to Floyd-Warshall's Al		t Pat	h bei	weer	1 eve	ery pair of	vertices	ın a gr	aph usın	g	
8	Write a Program to i		<u>Luon</u> h	Cal	211818	~						
8	Wille a Flogram to I	inpiement C	парп		otal	<u>g.</u>						60
		Course	Out							Dr	oar	amme
		Course	Out	com	.3					I	_	come
CO	To Introduce the fundar	mental conc	epts	in gr	aph t	heor	y Graphs,	sub grap	hs, wal			<u> </u>
	Euler graphs, Hamilton											
	Understanding the cond									MAC	\1	
I I	Isomorphism and Comb	-					•			PC PC)1	
	Applying the concept						Number,	Directe	d Grap	hs, Do	\1 ·	DO2
	Matching, Covering Pa	ttern and Eu	ler C	raph	S.					P	<i>)</i> 1, .	PO2
CO3	Analysing the Various	Concepts of	Rep	resen	tatio	n of	Graphs, E	uler Path	ıs Circu	it, Do	ν.	PO6
	Kruskals and Prims Alg									1	<i>7</i> 4, .	100
	Implementation of an a									PO)4,]	PO5,
	Applications with trave									PO)6	
	To Introduce the funda)3.	PO5
	Euler graphs, Hamilton	ian Paths Tr					iltonian p	aths and	circuits	S. 1 \	,,,	
					<u> Book</u>							
1	Narsingh Deo, "Grap		th A	pplic	ation	to E	ingineering	g and Co	mputer	Science	" Pr	rentice
1	Hall of India 2010 (Rep		1 *		1) (C	TT'11 22	.07			
	D II.(D' . 1.		d Its	App.	ııcatı	on "	Mc Graw	Hill , 20	U'/			
	Rosen H "Discrete Mat					1						
2			Refe	renc	e Bo		.i.a	-44 TZ		1		
1.	Discrete Maths for Con	nputer Scien	Refe tists	renc & M	e Bo	matio			del, Ba	ker		
1.		nputer Scien	Refe tists at G	renc & M raph	e Bo ather	matio			del, Ba	ker		
1. 2.	Discrete Maths for Con Clark J and Holton DA	nputer Scien "First look	Refe tists at G Wel	renc & M raph b Res	e Bo ather Theo	matio ory" ces	Allied Pub	olishers 1	del, Ba	ker		
1. 2.	Discrete Maths for Con	nputer Scien "First look DL Library,	Refe tists at G Wel E-co	renc & M raph b Res	e Bo ather Theo source from	mationry" ces n ope	Allied Pub en source l	olishers l	del, Ba			

Subject	Subject Name	Category	L	T	P	S	Credits	Inst.		Marks	
Code	·	,						Hours	CIA	External	Total
23BCAA6	Computer Oriented	EC – 6	3				3	3	25	75	100
	Numerical Methods	Allied	3	-	_	_	3	3	23	13	100
			earni								
LO1	To introduce the vario										
LO2	To make understand the fundamentals of algebraic equations.										
LO3	To apply interpolation and approximation on examples.										
LO4	To solve problems using numerical differentiation and integration.										
LO5	To solve linear system	is, numerica	l solı				ıry differei	ntial equ	ations.		
UNIT					tent						No. of Hours
UNIT I	FUNDAMENTALS				_			_			
	transcendental equation										15
	Raphson method –line	ear system o	f equ	ation	1s – (Gaus	s eliminati	on meth	od – G	auss	10
	Jordan method .	DDOL ATIA	O 3 1	4 3 730		DD 0	XXXX # A 753	ON I		.1 1	
UNIT II	ITERATIVE, INTE										
	Gauss Jacobi and Ga										
	Jacobi's method for								quai 11	niervais –	
UNIT III	Lagrange's interpolati INTERPOLATION								010011	otora and	
UNII III	relationsInterpolati										15
	difference formulae.	on with co	luai	mic	ı vais		incwion s	101 warc	and	Dackward	13
UNIT IV		NUMERICAL DIFFERENTIATION AND INTEGRATION: Approximation of									
								I()N· A	nnrox1	mation of	
	I										15
	derivatives using inter										15
UNIT V	I	rpolation po	lyno	mials		ume		ration us	sing Tr		15
	derivatives using inter Simpson's 1/3 rule INITIAL VALUE	rpolation po	lyno EM:	mials S	s – N FOR	ume	rical integ	ration us	sing Tr	apezoidal,	
	derivatives using inter Simpson's 1/3 rule	PROBL le step met	lynor EM: hods	mials S - T	S – N FOR Taylor	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method –	15
	derivatives using inter Simpson's 1/3 rule INITIAL VALUE EQUATIONS: Singl	PROBL le step met hod - Rung	LEMS hods e Ku	mials S T tta n	S – N FOR Taylor	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method –	
	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met	PROBL le step met hod - Rung	LEMS hods e Ku	mials S T tta m ods	S – N FOR Taylor	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method –	
	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met	PROBLE Step met hod - Rung Multi step 1	EMS hods e Ku	S Tutta nods	FOR aylometho	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method – Third and	15 75
	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met	PROBL le step met hod - Rung	EMS hods e Ku	S Tutta nods	FOR aylometho	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	RENTIAL method – Third and	15
UNIT V	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met	PROBL le step met hod - Rung Multi step i	EMS hods e Ku metho	S - T tta n ods To	FOR aylometho	r's s	rical integ ORDINAL eries metl	RY D	sing Tr IFFEF uler's	RENTIAL method – Third and	15 75 gramm
CO C	derivatives using inter Simpson's 1/3 rule INITIAL VALUE EQUATIONS: Singl Modified Euler's met 4th) order equations –	PROBL le step met hod - Rung Multi step i Course urse, student	EMS hods e Kumetho	S Titta nods Tocomo	FOR Taylor nethoo	r's s	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method – Third and Pro e O	15 75 gramm
CO CO CO K	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met 4th) order equations— On completion of this contact the second sec	PROBL le step met hod - Rung Multi step i Course urse, student us problems	EMS hods e Ku methe Out	S Titta nods Tocomo	FOR Taylor nethoo	r's s	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	apezoidal, RENTIAL method – Third and Pro e O	15 75 gramm utcome
CO CO1 K CO2 U	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained to the c	PROBL le step met hod - Rung Multi step i Course urse, student us problems ve problems	LEMS hods e Ku methe Out	S - Total nods - Total node - T	FOR Taylor nethonotal es	r's s	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	RENTIAL method – Third and Pro e O	15 75 gramm utcome
CO CO1 K CO2 U CO3 I	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met 4th) order equations— On completion of this contained with the contained modern and the contained m	PROBLE Step met I hod - Rung Multi step 1 Course urse, student us problems ve problems ration conce	EMS hods e Ku metho Out s on r pt are	S - T tta n ods Come	FOR Taylor nethodotal es	r's s	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	RENTIAL method – Third and Pro e O PO1 PO2 PO2	75 gramm utcome
CO CO1 K CO2 U CO3 II CO4 A	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained by the c	PROBLE Step met hod - Rung Multi step in Course urse, student us problems ve problems ration conce or solving line.	EMS hods e Kumetho	S - Totta mods Tocomo	FOR Taylomethodotal es	r's s	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	PO1 PO2 PO4	75 gramm utcome , PO6
CO CO1 K CO2 U CO3 I CO4 A	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met 4th) order equations— On completion of this contained by the contained Euler's met approximation to solution of the contained Euler's methods for the contained Euler's method Euler's methods for the contained Euler's methods for the contained Euler's methods for the contained Euler's method Euler's	PROBLE Step met hod - Rung Multi step in Course urse, student us problems ve problems ration conce or solving line.	DEMS hods hods e Ku methe Out s on r pt are near s rentia	S - Totta mods Tocomo	FOR Caylonethonethonethonethonethonethonethoneth	r's sod fo	ORDINAL eries methor solving(RY D	sing Tr IFFEF uler's	PO1 PO2 PO4	75 gramm utcome , PO6
CO CO1 K CO2 U CO3 I CO4 A CO5 N	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Single Modified Euler's met 4th) order equations— On completion of this contained by the contained and integrate approximation and integrate apply, direct methods for sumerical solution of order alagurusamy, E., Nume	PROBLE Step met hod - Rung Multi step in Course students we problems ration concept or solving lindinary differ rical Method	DEMS hods e Ku methe Out s on r s pt are rentia T ds, T	Tods Tods Tods Tods Tods Todo Come e app syste l equ cata N	FOR Taylor nethon tal es	met aw H	ORDINAL eries methods hods	RY D nod – E first, see	IFFER uler's cond,	Proe O PO1 PO2 PO4 PO5	75 gramm utcome , PO6 , PO6 , PO6
CO CO COO COO COO COO COO COO COO COO C	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained by the contained integration and integration and integration in the contained in t	PROBLE Step met hod - Rung Multi step in Course students we problems ration concept or solving lindinary differ rical Method	DEMS hods e Ku methe Out s on r s pt are rentia T ds, T	Tods Tods Tods Tods Tods Todo Come e app syste l equ cata N	FOR Taylor nethon tal es	met aw H	ORDINAL eries methods hods	RY D nod – E first, see	IFFER uler's cond,	Proe O PO1 PO2 PO4 PO5	75 gramm utcome , PO6 , PO6 , PO6
CO CO1 K CO2 U CO3 E CO4 A CO5 N	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained by the contained and integrate approximation and integrate apply, direct methods for sumerical solution of order alagurusamy, E., Nume alagraman V., Computer 998.	PROBLE Step met hod - Rung Multi step in Course students we problems ration concept solving lindinary differ rical Method Oriented N	DEMS hods e Ku methe Out s on r c pt are mear s rentia T ds, T umer	Tods Tods Tods Tods Tods Tods Toda Toda Toda Toda Toda Toda Toda Toda	FOR Caylor nethor otal es	metlans	orical integration of the property of the prop	ration us RY D nod – E first, see	IFFEE uler's cond,	Proe O PO1 PO2 PO4 PO5	75 gramm utcome , PO6 , PO6 , PO6
CO CO1 K CO2 U CO3 E CO4 A CO5 N	derivatives using intersising simpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained approximation to solve various approximation and integrapply, direct methods for sumerical solution of order approximation of order approxim	PROBLE Step met hod - Rung Multi step in Course students we problems ration concept solving lindinary differ rical Method Oriented N	DEMS hods e Ku methe Out s on r c pt are mear s rentia T ds, T umer	Tods Tods Tods Tods Tods Tods Toda Toda Toda Toda Toda Toda Toda Toda	FOR Caylor nethor otal es	metlans	orical integration of the property of the prop	ration us RY D nod – E first, see	IFFEE uler's cond,	Proe O PO1 PO2 PO4 PO5	75 gramm utcome , PO6 , PO6 , PO6
CO CO1 K CO2 U CO3 I CO4 A CO5 N 1 E 2 R 1	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained by the contained and integrate approximation and integrate apply, direct methods for sumerical solution of order alagurusamy, E., Nume alagraman V., Computer 998.	PROBI le step met hod - Rung Multi step i Course urse, student us problems ve problems ration conce or solving lindinary differ rical Method Oriented N	DEMS hods hods e Ku methe Out s on r c pt are near s rentia T ds, T umer	Tods Tods Todo Il Inume e app syster Il equ ext I ata M rical	FOR Caylor nethodotal es Diied ms Diied McGr Methodotal es Diied ms Diied m	metlans aw Hoods,	orical integration of the property of the prop	ration us RY D nod – E first, see	IFFEF uler's cond,	Proe O PO1 PO2 PO4 PO5 India, Nev	75 gramm utcome , PO6 , PO4 , PO6 , PO6
CO C	derivatives using intersimpson's 1/3 rule INITIAL VALUE EQUATIONS: Singly Modified Euler's met 4th) order equations— On completion of this contained by the contained solve varion of the contained solve in	PROBLE step met hod - Rung Multi step in Course urse, student us problems ve problems ration conce or solving lindinary differ rical Method Oriented Noriented Norient	Demonstrate of the control of the co	Tota mods Tocomo Il Inume e app system l equivers I e	FOR Taylor nethodotal es erical es e	metal	Prical integration of the prical integration	RY D nod – E first, see n, Prentice Verlag, orithms,	IFFEF uler's cond,	Proe O PO1 PO2 PO4 PO5 India, Nev	15 75 gramm utcome , PO6 , PO6 , PO6 , PO6 , PO6 , PO8

4.	iv vami, ivitin, if onem, evictin, vami in the state of iviting and in eviction and engineering					
	Competit	tion, New Age Int. (P)Ltd., New Delhi, 1997				
	Web Resources					
	1.	https://www.udemy.com/course/computer-oriented-numerical-techniques/				

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	T	P	S	Credits	Inst.	Marks				
								Hours	CIA	External	Total	
23BCAAP6	Computer Oriented Numerical Methods Lab (using C)	EC – 7 Allied	-	-	2	-	2	2	25	75	100	
	(8 /	Lea	rnin	g Ol	ject	ives	I.	l				
LO1	To introduce the vario						s.					
LO2	To make understand the fundamentals of algebraic equations.											
LO3	To apply interpolation and approximation on examples.											
LO4	To solve problems usi	ng numerica	l dif	feren	tiatio	n an	d integrati	on.				
LO5	To solve linear system	s, numerical	l solu	ıtion	of o	rdina	ry differen	tial equa	tions.			
	<u> </u>	<u> </u>			ails		<u> </u>				No. of Hours	
1	Write a C Program to	find the root	s of	non-	linea	r equ	ation using	g bisection	on met	hod.	Hours	
2	Write a C Program to										60	
3	Write a C Program to method.											
4	Write a C Program to	integrate nui	merio	rally	usin	o Tra	nezoidal I	Rule				
5	Write a C Program to						•					
6	Write a C Program for											
7	Write a C Program to						ation math	and for f	ndina	f(v) for a		
1	given x	impiement i	Lagra	ange	5 1110	cipoi	anon men	100 101 11	munig	1(X) 101 a		
8	Write a C Program to	find the larg	est e	igen	valu	e of a	a matrix by	power -	metho	od.		
9	Write a C Program to euler's method.						•	-				
10	Write a C Program to runge- kutta method.	o find nume	erical	l sol	ution	of	ordinary d	ifferenti	al equ	ations by		
										Total	60	
,	Co	ourse Outco	mes							Programi Outcom		
CO	On completion of this	•										
CO1	Know how to solve va			n nu	meri	cal n	nethods		PO1			
CO2	Use approximation to solve problems						PO1, PO2					
CO3 CO4	Differentiation and int							PO4, PO6 PO4, PO5, PO6				
CO4	Apply, direct methods Numerical solution of									4, PO3, PO 3, PO5	U	
003	Trumerical solution of	ordinary dri		kt Bo		10113			10.	3,103		
1	Balagurusamy, E., Nu	merical Met				Grav	w Hill, 199	9.				
2	Rajaraman V., Compu Delhi, 1998.								ntice I	Hall India, 1	New	
					Bool							
1.	Stoor, Bullrich, Comp											
2.	Krishnamurthy, E.V., 1998.											
3.	Jain, M.K., Iyengar, S Int. (P) Ltd., New Dell		R.K.,	, Nur	neric	al M	lethods: Pr	oblems a	ind So	lutions, Nev	w Age	

4.	4. Jain, M.K., Iyengar, S.R.K., Jain R.J., Numerical Methods for Scientific and Engineering Competition, New Age Int. (P) Ltd., New Delhi, 1997						
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CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1