E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS)

Approved by AICTE, New Delhi (Affiliated to Anna University, Chennai | Re-accredited by NAAC with 'A++ 'Grade) Accredited by NBA (B.Tech-IT, B.E-CSE and ECE)(Tier-1) NAGAPATTINAM – 611002



B.TECH - INFORMATION TECHNOLOGY R – 2023

SECOND YEAR - THIRD SUM

CURRICULUM AND SYLLABUS FOR THIRD SEMESTER

Course Code	Course Name	Category	L	Т	Р	С
2301MA306	Queuing and Network Model	BSC	3	1	0	4
2302IT301	Data Structures and Algorithms	PCC	3	0	0	3
2302IT302	Computer Organization and Architecture	PCC	3	0	0	3
2302IT303	Problem solving using Python	PCC	2	0	4	4
2302IT304	Database Management Systems	PCC	3	0	0	3
2301HSX01	Universal Human Values and Ethics	HSMC	2	0	0	2
2302IT351	Data Structures and Algorithms Laboratory	PCC	0	0	2	1
2302IT352	Database Management Systems Laboratory	PCC	0	0	2	1
2304GE301	Professional Development Course -I	EEC	0	0	2	1
2301LS301	Life skill-III	MC	0	0	0	0
	Total		15	2	12	22

2301MA306			QUE	EUING	J MOI	DEL A	ND N	ETWO)RK N	IODE	L	L	T	Р	С
												3	1	0	4
PREREQUI	ISITE	:													
	1														
	1. En	gineer	ring Ma	athema	tics-I										
	2. En	gineer	ng Ma	athema	tics-II	1									
	<i>3</i> . Ва	SICS O	t Queu	ing and	a Netw	ork co	ncepts	•							
COURSE O	BIEC	TIVE	S٠												
COURSEO	DJLC		0.												
	1. To	o unde	erstand	the ba	sics of	Linea	progr	ammin	g and	formul	ation of	LPP.			
	2. To	o analy	yze the	conce	pt of T	ranspo	ortation	and A	Assignn	nent m	odels.				
	3. To	o unde	erstand	the ba	sic con	icept of	f real t	ime pr	oblems	in sin	nulation	•			
	4. To	o empl	hasis tł	ne cono	cept of	netwo	rk moc	lel and	Techn	iques.					
	5. To	o empl	nasis o	n more	e advan	ice top	ics that	t are pa	articula	rly use	eful in n	nodelii	ng,		
	S	uch as	queur	ng theo	ory.										
COURSE O	UTCO	OMES	•												
			•												
On the suc	ccessfu	l com	pletion	of the	course	e, stude	ents wi	ll be a	ble to						
CO1:	Deve	elop n	nodels	and alg	gorithn	ns to ar	nalyze	queuei	ing sys	tems					
CO2:	Und	erstan	d the g	iven pr	roblem	as trai	nsporta	tion a	nd assi	gnmen	t proble	m			
<u>CO3:</u>	Ana	lyze th	e real	time pi	roblem	<u>s 11 S11</u>	nulatio	on Naissta							
CO4:	TO a	alon n	e the he	and al	constr corithr	uction	and pr	oject e	ing sv	OII	Analyze	the re	al tin	ne nrol	leme
005.	in si	mulati	on		gorium		maryze	queue	ing sy	sterns .	Anaryze			le prot	Jems
	1														
COs Vs PC)s MA	PPIN	G:												
 	<u> </u>	DO1	DOA	DOA	DO 4		DO(DOG	DOA		0.11	0.14	1	
	COS	2 2	PO2	PO3	P04	P05	PO6	P07	PO8	P09	POIU		POIZ	-	
	$\frac{CO1}{CO2}$	3	2	1	-	-	-	-	-	-	-	-	-		
	CO3	3	2	1	-	-	-	-	-	-	-	-	-		
	CO4	3	2	1	-	-	-	-	-	-	-	-	-		
	CO5	3	2	1	-	-	-	-	-	-	-	-	-		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~															
COs Vs PS	Os M	APPI	NG:												
					C			<u></u>	02						
						0313 01 1									
					C	01 1									
					C	03 1			-						
					С	04 1			-						
					С	<b>O5</b> 1			-						
COURSE C	ONTE	ENTS													
MODULEI	<b>. . . . .</b>			CDAN		C								01	lourg
<b>NODULE I</b> Formulation	LL Grat	NEAF	solutio	GKAN	mpley	G methor	1 _ Tw	o nhas	e meth	od-Ar	tificial v	ariabl	e metl	<b>9</b> nod	lours
										ou-An		anaur	e meu		[
MODULE I		ANS	PORI.	AIIO	nanu	ASSI proble	JNME m Ma	IN I M	ODEL for fin	dina in	aitial ha	sia fa	acibla		lours
optimum sol	ution -	dege	n or ur neracy	– Mat	tation hemati	cal for	mulati	on of	101 IIII acciont	ung n nent m	nual Da	SIC Tea	asible	Algori	л– thm
-Variants of	the As	sionm	ient nro	- mai	nemati		mulati		ussigill	nent fi	100015 -	Trung	anan	rigun	um
			PIC	-										T	
MODULE I		MULA	ATION	N .	0 1	<u>a</u>	·	<u>n</u> , 1		• 1	• •	11	<i>.</i>	<u>9 E</u>	lours
problems.	nt Sin	iulatio	n - M	onte –	Carlo	Simula	ation –	Stoch	astic S	imulat	10n – A	pplica	tions	to real	time

MODULE IV NETWORKMODEL	9 Hours
Network Construction–Critical Path Method–Project Evaluation and Review Technique–Resourc	e analysis
in Network Scheduling.	-
MODULE V QUEUEINGMODELS	9 Hours
Characteristics of Queuing Models – Markovian Queues– $(M/M/1)$ : $(FIFO/\infty/\infty)$ ,	
$(M/M/1)$ : $(FIFO/N/\infty)$ , $(M/M/C)$ : $(FIFO/\infty/\infty)$ , $(M/M/C)$ : $(FIFO/N/\infty)$ models–Little's formulae.	
TOTAL: 45	HOURS
REFERENCES:	
1. Grewal. B.S., "HigherEngineeringMathematics", 42 ndEdition, KhannaPublishers, Delhi, 2012	
2. Gross. Dand Harris C.M, "Fundamentals of Queuing Theory", Wiley Student Edition, 2004.	
3. Robertazzi, "Computer Networks and Systems: Queuing Theory and performance Evaluation",	Springer,
3 rd Edition, 2006	
4.TahaH.A. "OperationsResearch",Pearsoneducation,Asia,8" Edition,2007	
5. KalavathyS, OperationsResearch, SecondEdition, VikasPublishingHouse, 2004.	

6.D.S. Hira and P.K. Gupta, Operations Research, (Revised Edition), Published by S. Chand & Company Ltd, 2014

7. Winston, W.L., "Operations Research", Thomson – Brooks/Cole, Fourth Edition, Belmont, 2003.

2302IT301			DA	FA ST	'RUC'	TURE	S AN	D AL	GORI	THMS	5	]		Г	P	С
													3 (	0	0	3
PREPEOU	ISITE	•														
FREREQU	SIL	Drog	rammi	ng in (	and (	7										
		110g		ng m c		-11										
COURSE O	BJEC	TIVE	S:													
	1. L	earn th	e fund	amenta	al conc	epts of	f Data l	Structu	ires an	d Algo	rithm.					
	2. T	o apply	y the c	oncept	s of va	rious li	inear d	ata strı	uctures	•						
	3. T	o apply	y the c	oncept	s of va	rious n	online	ar data	struct	ures.						
	4. B	ecome	famili	ar with	the di	ifferent	t algori	thm de	esign te	echniq	ues.					
COUDSEO		MEG	·													
COURSE O	veful c	JMES comple	tion of	the co	11700 0	tudont	o will k	a abla	to							
On the succe	551UI C	ompie			uise, s	suuem	s will t		10							
CO1:	Und	erstan	d the c	oncept	s of Da	ata Stru	ictures	and A	lgorith	m.						
CO2:	Und	erstan	d and a	pply th	ne vari	ous co	ncepts	of Lin	ear dat	a Struc	ctures					
CO3:	Und	erstan	d and a	pply th	ne vari	ous co	ncepts	of Nor	n-Linea	ar data	Struct	ures.				
<b>CO4:</b>	App	ly Div	ide and	l Conq	uer an	d Dyna	amic pi	ogram	ming 1	nethoo	l to sol	ve diff	erent	pro	oblem	<b>.</b> S.
CO5:	App	ly Gre	edy teo	chnique	e and H	Backtra	cking	metho	d to so	lve dif	ferent	problei	ms.			
	)~ N/ A	DDIN	C.													
	JS MIA	PPIN	6:													
	COs	<b>PO1</b>	PO2	PO3	<b>PO4</b>	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO1	2		
	CO1	3	3	2	2	2	-	-	-	-	-	-	-	-		
	CO2	3	3	2	2	2	-	-	-	-	-	-	-			
	CO3	3	3	3	2	2	-	-	-	-	-	-	-			
	<b>CO4</b>	3	3	2	2	2	-	-	-	-	-	-	-			
	CO5	3	3	3	2	2	-	-	-	-	-	-	-			
		A DDI														
	005 111		10.													
					C	Os PS	O1 PS	O2PS	03							
					C	01 3	3 2	2 2	2							
					C	<b>O2</b> 3	3 2	2 1	-							
					C	<b>03</b> 3	3 2	2 2	2							
					C	<b>04</b> 3	3 2	2 1								
					C	<b>05</b> 3	3 2	2 2	2							
COUDER																
COURSE C	ONTI	ENTS:														
MODULEI	IN	TROI	HCT	ION											9 H	ours
Data Structu	res Ba	sics –	Data S	Structu	res an	d Type	es – Al	<u>от – Т</u>	Notion	of an	Algori	thm _	Fund	am	ental	s of
Algorithmic	Probl	em Sc	olving	– Fun	damen	tals of	f the A	Analysi	is of A	Algorit	thm Et	fficien	v - v	As	vmpt	otic
Notations – 1	Mather	matica	l analy	sis for	Recur	sive an	d Non-	-recurs	ive alg	gorithn	18		- )		JP	
MODULE I	I LI	NEAF	R DAŤ	A STF	UCT	URES									9 H	ours
Array: Type	s, Imp	lemen	tations	– Lis	t: Typ	bes, Ap	plicati	ons –	Stack	Oper	ations,	Array	and	Li	nked	list
implementat	ion, Ā	pplica	tions -	- Evalı	ation	of Ari	thmeti	c Expi	ression	s – Q	ueues:	Opera	tions	, A	rray a	and
Linked list in	nplem	entatio	on.													
MODULE I	II NO	DN-LI	NEAR	A DAT	A STF	RUCTU	JRES								9 Ho	ours
Tree: Tree T	ermino	ologies	s, Bina	ry Tree	e Repr	esentat	tion, T	ree Tra	versal	s, Bina	ary Sea	arch Tr	ees, l	Bin	ary H	eap,
Hasning, AV	L Ire	e – Gi	apn: I	kepres	entatio	on of G	rapns,	Topol	ogical	Sort, I	Jepth	First So	earch	an	a Bre	aath
MODIILE I	v n	VIDF	-AND	CON	JIFP	AND	DVN	MIC	PROG	RAM	MIN	Ţ		Т	9 H	01115
Divide and	condue	er met	hodolo	$\frac{2}{9}$ gy $-\frac{9}{2}$	Sorting	r Tech	nique:	Merge	e sort	Ouick	sort -	- Searc	ching	Τe	echnic	iue:
Linear searc	h, Bin	ary sea	arch –	Compi	iting a	Binor	nial Co	pefficie	ent – F	Floyd V	Warsha	ll Alg	orithr	n –	Opti	mal
Binary Searc	h Tree	<u>es – T</u> r	avellin	g Sales	<u>sman F</u>	Problen	<u>n – To</u>	wer of	<u>Hano</u> i	Proble	em.				•	

#### MODULE V GREEDY TECHNIQUE AND BACKTRACKING

9 Hours

Greedy Technique: Minimum Spanning Tree: Prim's Algorithm, Kruskal's Algorithm – Shortest path algorithm: Dijkstra's Algorithm – Huffman Trees code – Knapsack Problem – Backtracking: N-Queen Problem, Graph Coloring Problem.

# TOTAL: 45 HOURS

#### **REFERENCES:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/ MIT Press, 2022

2.Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014

3. Reema Thareja, "Data Structures Using C", Oxford University Press, 2011

4. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 2012

5. Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.

6. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

7. nptel.ac.in/

2302IT302		COM	<b>IPUT</b>	ER OF	RGAN	IZATI	ION A	ND Al	RCHI	ГЕСТ	URE	]	L	T	Р	С
												, ,	3	0	0	3
PREBEOIII	SITE	•														
I KEKEQU	LOT L.	· Racice	of Con	muter	Struct	ire										
	L	Jusies		iputer	Suucu											
<b>COURSE O</b>	BJEC	TIVE	S:													
	1. To	o make	e stude	nts un	derstan	d the b	oasic st	ructure	e and o	peration	on of d	igital c	comp	uter		
	2. To	o study	y the co	oncept	s of pip	pelinin	g.									
	3. To	o expo	se the	studen	ts to th	e conc	ept of	paralle	lism							
	4.To	famil	iarize t	he stu	dents v	vith hie	erarchi	cal me	mory s	ystem	includ	ing ca	che n	nem	ories	and
	vırtu	al mei	mory.													
COURSEO		MES	•													
After comple	etion of	f the c	ourse	Studer	t will 1	he ahle	to									
			ourse,	Studer			10									
CO1:	Und	erstand	d the c	oncept	s of str	ucture	of con	nputers	s and n	nachin	e instru	ctions				
<b>CO2:</b>	Expl	lain the	e conce	epts of	proces	ssing N	Iodule	s								
CO3:	Desi	ign and	l analy	ze pip	elined	control	l Modu	ıles								
<b>CO4:</b>	Eval	uate p	erform	ance o	f mem	ory sys	stems									
<b>CO5:</b>	Und	erstand	d disk s	storage	e and a	pply R	AID co	oncept	s in rea	al time	proble	ms				
		DDIN	c.													
	JS MIA	PPIN	6:													
1	COs	<b>PO1</b>	<b>PO</b> 2	<b>PO3</b>	<b>PO4</b>	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO	12		
	C01	3	2	1	-	-	-	-	-	-	-	-	-	-		
	<b>CO2</b>	3	2	1	-	-	-	-	-	-	-	-	-			
	CO3	3	3	3	2	1	-	-	-	-	-	-	-			
	<b>CO4</b>	3	2	2	1	1	-	-	-	-	-	-	-			
	CO5	3	2	2	1	1	-	-	-	-	-	-	-			
			NC.													
	US ML	AFFI	NG:													
					C	Os PS	O1 PS	O2PS	03							
					C	01 2	$\frac{0115}{2}$	2 1								
					Č	<b>O2</b> 2	2 2	2 1								
					C	03 3	3 2	2 1								
					C	<b>O4</b> 3	3 2	2 2	2							
					С	<b>O5</b> 2	2 2	2 1								
COURSE C	ONTE	ENTS:														
	GT	DIG	DUDD				7 0 M	ACIT				NT.		<u> </u>	0.11	
MODULE I	 	<b>KUC</b>	IUKE	OF C	<u>UMP</u>	Drease	5 & M	ACHI	NE IN	Darf		$\frac{1}{1}$	аа Г		9 <b>П</b>	
Operations	of the	Com	les 10 outer l	r Dull Hərdəy	ung l	perand	sors a le of t	ha Co	emory	, Peri r Har	ormano Juvoro	Signe	d ar	d I	Incia	all, ned
numbers R	enrese	nting	Instruc	rtions	in the	$\sim Con$	is of t muter		cal O	neratio	iware,	structi	ons	for	Mak	ing
Decisions. Si	upport	ing Pro	ocedur	es in C	Comput	er Har	dware.	Comn	nunica	ting w	ith Peo	nle.	0113	101	wian	шg
MODULE I	I PR	ROCE	SSING	MOI	DULE		<u>a ur e</u> ,	001111				p10.			9 H	ours
MIPS Addre	essing	for 32	2-Bit I	mmed	iate ar	nd Ado	dresses	. Para	llelism	and	Instruc	tions:	Sync	chro	nizati	on,
Translating a	and St	arting	a Pro	gram,	Additi	on and	l Subti	raction	, Mult	iplicat	ion, Di	ivisior	, Flo	oatir	ng Po	int,
Parallelism a	and Co	mpute	r Arith	metic	Sub v	vord P	aralleli	sm, Re	eal Stu	ff: Str	eaming	g SIMI	) Ex	tens	sions a	and
Advanced V	ector E	Extensi	ions in	x86.												
MODULE I	II PI	PELI	NING												9 H	ours
Logic Desig	n Cor	iventic	ons, B	uilding	a Da	tapath	, A Si	imple	Implei	mentat	ion Sc	heme,	An	ove	erviev	v of
Fipelining, F	1pelin Parall	ed Dat	tapath	and C	ontrol,	, Data	Hazar ff. The	as: Fo	rwardi	ng ver	sus Sta	alling, Intol	Core	trol	Haza Pipoli	irds,
Going Faster	: Instr	uction	–Leve	el Para	llelism	and M	Iatrix I	Multin	lv. An	Introd	uction	to Dig	rital	Des	ign U	sing

a Hardware Design Language to Describe and Model a Pipeline.	
MODULE IV MEMORY	9 Hours
Memory Technologies, the Basics of Caches, Measuring and Improving Cache Performance, de	ependable
memory hierarchy, Virtual Machines, Virtual Memory, A Common Framework for Memory H	lierarchy,
Using a Finite- State Machine to Control a Simple Cache, Parallelism and Memory Hierarchy: R	edundant
Arrays of Inexpensive Disks, Advanced Material: Implementing Cache Controllers, Real Stuff: T	The ARM
Cortex-A8 and Intel Core i7 Memory Hierarchies, Going Faster: Cache Blocking and Matrix Multi	ply.
MODULE V DISK STORAGE	9 Hours
Disk Storage and Dependability-RAID levels-hardware multi-threading-clusters- message	passing
multiprocessors-Multiprocessors network topologies.	
TOTAL: 45	HOURS
REFERENCES:	
1.David A. Patterson and John L. Hennessey, "Computer organization and design, The Hardwa	ıre/Software
interface", Morgan Kauffman / Elsevier, Fifth edition, 2014.	
2.Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", 5th Edition, Ta Hill, 2013.	ta McGraw

3.William Stallings, —Computer Organization and Architecture – Designing for Performancel, Sixth Edition, Pearson Education, 2013.

4.V.P. Heuring, H.F. Jordan, —Computer Systems Design and Architecture^{II}, Second Edition, Pearson Education, 2015. 5.Behrooz Parhami, —Computer Architecture^{II}, Oxford University Press, 2012.

6.http://nptel.ac.in

2302IT303	IT303PROBLEM SOLVING USING PYTHONLTPC2044															
													2	0	4	4
DDEDEAL	STTE											1		ı	ı	
PREREQU	SILE	: 		T												
		Prog	gramm	ng Lai	nguage	s										
COUDSEO	DIEC	TIVE	<b>c</b> .													
COURSE O	DJEU	IIVE	5:													
	1	1	4 4 4 4 4 4 4													
	1.10	KNOW	the ba	SICS OI	prodic	h an m	ving	~								
	2.10 2.To	read a	and wr	hon nr	pie Py	non pi	ogram	$\frac{S}{2}$		d data	atmost					
	3.10 4 To	devel	op Pyu	non pr	ograms	s with onl	thom	ons, io	ops an	a data	structu	ires.				
	4.10	do in	e Fyllic	ni tunc	th filos	in Dut	hon									
	5.10	uo m	Jui/Out	put wi	ui mes	in i yt										
COURSE O	UTCO	OMES	•													
At the end of	f this c	ourse.	studen	ts will	be abl	e to.										
			500001			• •••,										
CO1:	Exec	cute Pv	thon c	ode in	variet	v of en	vironm	nents								
CO2:	Use	the co	rrect P	vthon of	control	flow c	constru	ct								
CO3:	Desi	gn Da	ta struc	tures a	and fur	nctions	using	pythor	1							
<b>CO4:</b>	Impl	lement	File, N	Module	es and	Packag	ges con	cepts i	ising F	ython						
CO5:	Crea	te thei	r own	classes	s and u	se exis	ting py	thon c	lasses							
COs Vs PC	)s MA	PPIN	G:													
													. —			
	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1	1 PC	012		
	CO1	3	3	2	2	2	-	-	-	-	-	1		-		
	CO2	202 3 3 2 2 2 1 -														
	CO3	3	3	2	2	2	-	-	-	-	-	1		-		
	CO4	3	3	2	2	2	-	-	-	-	-	1	_	-		
	C05	3	3	3	2	2	-	-	-	-	-	I		-		
	US IVI	AFFI	NG:													
					C	Oc PS	01 PS	02 PS	03							
						01 3			05							
						$\frac{01}{02}$	2 2	1								
						02 $3$	$\frac{1}{2}$ $\frac{1}{2}$	1								
						03 $3$ $04$ $3$	$\frac{1}{2}$ $\frac{1}{2}$	1								
						04 3	$\frac{2}{2}$	1								
					U	05 3	2	1								
COURSE C	ONTE	INTS														
	UIII	21110.														
MODULE I	PR	OBL	EM SC	)LVIN	IG AN	D PY'	<b>THON</b>	INTR	ODU	CTIO	N				9 H	ours
Problem solv	ving te	chniau	les: Pro	ogram	develo	pment	life-cy	$rcle - \lambda$	Algori	hms –	buildi	ng hl	ocks	s of a	gorith	ms
-Flowchart–	Pseudo	o Code	e-Illust	rative	proble	ns. Int	roducti	ion to ]	Pythor	. Pvth	on Inte	rpret	er ai	nd its	worki	ng.
Syntax and S	lemant	ics		luitio	p1001 <b>0</b> 1		loudet		i yenor	, <b>1</b> y ui		-prot	er ui	14 165		
MODULE I	I PV	THO	NBAS	ICS											9 H	ours
Data Types	operate	ors lo	ons As	signm	ents ar	nd Exp	ression	is Con	trol Fl	ow Sta	atemen	ts				
Data Types,	operation		000,710	55151111			1055101			ow bu	atemen			r		
MODULE I	II DA	TA S	TRUC	TUR	<u>ES AN</u>	D FUI	NCTIC	DNS		. ~					9 H	ours
Lists-Tuples	-Dictio	naries	-Funct	ions ar	nd lam	oda ex	pressio	ns-Iter	ations	and C	omprel	nensi	ons.		0.11	
MODULE I	V FI	LES,N	<u>10DU</u>	LES A	ND P	ackag	es					1 1.			9 H	ours
Files and exe	ceptior	1: text	files, r	eading	g and v	vriting	files, f	ormat	operat	tor; co	mmanc	1 line	arg	umen	its, eri	ors
and exceptio	ns, har	ndling	except	ions, n	nodule	s, pack	ages			_					~	
MODULE V	/ CL	LASSE	ES OB.	JECTS	S And	REGU	JLAR	EXPR	ESSI	ONS					9 H	ours
Overview of	OOPs	termi	nology	-class-	inherit	ance-o	verload	ling-R	egular	Expre	ssions					
												ΤΟ	TAI	<b>45</b>	HOU	RS

#### **REFERENCES:**

1. Martin. C. Brown, "PYTHON: The Complete Reference", McGraw Hill, 2001.

2.Naomi R. Ceder , The Quick Python Book, Second Edition,2010

3. *Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for* 4. *Python 3.2, Network Theory Ltd., 2011.* 

5. John V Guttag, —Introduction to Computation and Programming Using Python ", Revised and 6. expanded Edition, MIT Press, 2013

7. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An 8. Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

9. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition,

10.Updatedfor Python 3,Shroff/OʻReilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/) 11.http://nptel.ac.in/

2302IT304			Ι	DATA	BASE	MAN	IAGEN	MENT	SYS	ГEMS		]	L T	P	С
													3 0	0	3
PREPENI	SITE														1
INEREQU		Prog	rammi	ng and	Proble	em Sol	lving I	Data St	ructur	e and	Algori	thms			
		1105		ing and	11000		tving, i		luctur	cs and	ngon	ums			
COURSE O	BJEC	TIVE	S:												
	1. To	o unde	erstand	the fur	ndamer	ntals of	f data 1	nodels	and co	oncept	ualize	and de	pict a d	latabas	e
	syste	em usi	ng ER	diagra	m										
	2. To	o make	e a stuc	ly of S	QL an	d relat	ional d	atabas	e desig	'n					
	3. To	<u>o knov</u>	v about	t data s	storage	techni	iques a	query	proces	ssing.					
	4. To	o impa	irt knov	wledge	e in trai	nsactio	on proc	essing,	, concu	irrency	contro	ol techi	niques	and	
	reco	very p	roceau	the stu	dantar		a diffa	namt tru	nos of	dataha					
COURSE O	<u>3.10</u> UTCC	) Tanin ) MES	inarize	the stu	dents v		e ante	rent ty	pes of	uataba	ses.				
After comple	etion of	f the c	ourse	Studer	t will l	be able	e to								
			04150,	Studen		o <b>c</b> uoit									
CO1:	Clas	sify th	e mod	ern and	l futuri	istic da	atabase	applic	ations	based	on size	e and c	ompley	ity	
CO2:	Map	ER m	nodel to	o Relat	ional r	nodel t	to perfe	orm da	tabase	design	effect	ively	_		
CO3:	App	ly que	ries usi	ing noi	rmaliza	ation c	riteria	and op	timize	the qu	eries				
<u>CO4:</u>	Com	pare a	and cor	ntrast v	arious	indexi	ing stra	tegies	in diff	erent d	atabas	e syste	ms		
<u>CO5:</u>	App	raise h	low ad	vanced	datab	ases di	tter tro	om trac	litional	datab	ases	· 1			
<u> </u>	Desi	gn XN	/IL sch	ema, a	ble to	write 2	XML q	ueries	for inf	ormati	on retr	ieval			
COs Vs PC	)s MA	PPIN	G:												
	<i>,,,,,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		01												
	COs	<b>PO1</b>	PO2	PO3	<b>PO4</b>	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	<b>PO12</b>		
	CO1	3	2	-	-	-	-	-	-	-	-	-	2		
	CO2	3	2	1	2	-	-	-	-	-	-	-	2		
	CO3	3	2	2	1	2	-	-	-	-	-	-	2		
	C04	3	2	2	1	-	-	-	-	-	-	-	2		
	CO6	3	2	$\frac{2}{2}$	1	$\frac{2}{2}$	-	-	-	-	-	-	2		
		5	2	2	1	4		l					4		
COs Vs PS	Os M	APPI	NG:												
					C	Os PS	SO1 PS	O2PS	03						
					C	01 3	3 2	2 1	L						
					C	02 3	3 3	3 1	L						
					C	03 3	3 3	3 2	2						
					C	04 3	3 2	$\frac{2}{2}$							
					C	05	5 3	$\frac{3}{2}$	2						
					U	00	5	2	2						
COURSE C	ONTE	INTS	,												
COURSEC			,												
<b>MODULE I</b>	IN	TROI	DUCT	ION										9 H	ours
Introduction	to dat	tabase	- Dat	a Base	e Arch	itectur	re - D	ata Inc	lepend	ence -	Func	tional	Depen	dencies	s —-
Relational A	lgebra-	-Entity	relation	onship	model	- map	ping c	ardinal	ities-k	eys, E-	R diag	grams.	-		
MODULE I	I QU	JERY	LAN	GUAG	E & C	<b>PTIN</b>	<b>IIZAT</b>	ION						<b>9</b> H	lours
Relational C	alculu	s – Ti	uple R	elation	al Cal	culus ·	– Dom	nain Re	elation	al Cal	culus -	- SQL	— DI	DL- DN	ЛL-
DCL-TCL-E	mbedd	led So	QL-Sta	tic Vs	b Dyna	amic S	SQL -	View	s - C	onstrai	nts –	Query	proce	essing	and
optimization	Nor	mal F	orms –	$\frac{1NFt}{1}$	o 5NF	-Doma	un Key	v Norm	al For	m				0.77	
		ANSA	AUTI(	JN PR	UCES	SING	r stiense	<b>C</b>	1	:	Cont		Cart	<u>9 Ho</u>	urs
Mechanisms	– Tim	ssing e Star	– Pro np ord	ering -	Two p	hase (	Commi	–Seria t Proto	ocol-De	ny - eadlocl	concu c-Reco	overy s	ystems	-Log-b	ased

recovery.	
MODULE IV FILES AND INDEXING	9 Hours
O3verview of Physical Storage Media-RAID -File Organization-File operations – Hashing Tech Indexing -Single level and Multi-level Indexes-B+ tree Index Files-B tree Index Files.	nniques –
MODULE V ADVANCED TOPICS	9 Hours
Data warehousing, heterogeneous component systems-Data mining and knowledge discovery-OG Object Relational Databases –XML Data Base - Cloud based systems – NOSQL introduction -H model -Database Tuning -Case Study for Design and Manage the Database for any Project.	ODBMS- base data
TOTAL: 45	HOURS
REFERENCES:	
1.Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition Hill, 2017.	n, McGraw
2. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems",Fifth Editic Education, 2013.	on, Pearson
3. Thomas M. Connolly and Carolyn E. Begg, —Database Systems - A Practical Approach to Design, Implementation, and Management I, fifth edition, Pearson Education, 2011	
4.C.J.Date, A.Kannan and S.Swamynathan, —An Introduction to Database Systems ^{II} , Eighth Edition, P. Education, 2012.	earson
5.Raghu Ramakrishnan, —Database Management Systems ^{II} , Fourth Edition, McGraw-Hill College Publications, 2015.	
6.Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012	
7.http://nptel.ac.in/	
8.http://coursera.org/	

2302IT351		DA	TA S	TRU	CTUR	RES A	ND A	LGO	RITH	MS L	AB	I	T	P	C
												0	) ()	2	1
DDEDEQU		_											Ŭ	-	
PREREQU	$\frac{1511E}{9 \text{ in C}}$	and C-	++												
i iogrammin	1	Lear	n the f	undam	ental c	oncept	ts of D	ata Str	uctures	s and A	Algorith	nm.			
	2	To a	pply th	ne conc	epts of	f vario	us line	ar data	struct	ures.	U				
	3.	To a	pply th	ne conc	epts of	f vario	us non	linear o	data sti	ructure	s.				
	4	Becc	ome fai	miliar	with th	e diffe	rent al	gorithr	n desig	gn tech	niques	•			
COURSE O	BJEC	TIVE	S:												
	1	1 I c	orn th	o fund	amonto	1 conc	ants of	Data (	Structu	racan		rithm			
	2	$\frac{1}{2}$ To	ann un annly	$\frac{1}{2}$ the co	ncents	s of var	rious li	near da	ata stri	ictures	I AIgu	101111.			
	3	. 3. To	apply apply	the co	oncepts	s of var	rious n	onlinea	ar data	structu	ıres.				
	4	. 4. Be	ecome	famili	ar with	the di	fferent	algori	thm de	sign te	echniqu	les.			
COUDSE O		MEG													
After comple	etion of	f the co	: ourse,	Studer	ıt will l	be able	e to								
CO	<b>1:</b> U	nderst	and th	e conc	epts of	Data S	Structu	res and	l Algo	rithm.					
CO	2: U	nderst	and an	d appl	y the v	arious	conce	ots of I	Linear	data St	tructure	es			
<u>CO</u>	3: U	Inderst	and an	d appl	y the v	arious	conce	ots of l	Non-Li	near d	ata Str	ictures		11.00	
CO	4: A	.pply	Divide	e and	Conqu	uer an	nd Dy	namic	progr	ammir	ng met	thod to	o solve	e diff	erent
CO	5: A	pplv (	is. Freedv	techni	aue an	d Back	ctracki	ng met	hod to	solve	differe	nt prob	lems.		
					-1			-8				p			
			~												
COs Vs PC	)s MA	PPIN	G:												
	COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
	CO1	3	3	2	2	2	-	-	-	-	-	-	-		
	CO2	3	3	2	2	2	-	-	-	-	-	-	-		
	CO3	3	3	3	2	2	-	-	-	-	-	-	-		
	CO4	3	3	2	2	2	-	-	-	-	-	-	-		
	CO5	3	3	3	2	2	-	-	-	-	-	-	-		
COs Vs PS	SOs M	APPIN	NG:												
					C	Oc PS	01 PS	03 PS	03						
					C	$\frac{0313}{01}$	3 2	$\frac{0215}{2}$	2						
					C	<b>O2</b> 3	3 2	2 1							
					С	<b>O3</b> 3	3 2	2 2	2						
					C	<b>O4</b> 3	3 2	2 1							
					C	<b>05</b> 3	3 2	2 2	2						
LIST OF E	XPER	IMEN	TS:												
1 DDI	a 1 T			a al c											
I. DDI	and L	OML C	ommai	nds	anda	aaraaa	to fun	tions							
2.1  ran	s and N	I CONT Jested	Ouerie	iniand:	s and a	ggrega	ue iuno	LIOIIS							
4 Con	straints	and V	Views												
High level n	rogram	ming	langua	ge exte	ensions	s (Cont	rol stri	ictures	. Proce	edures	and Fu	Inction	s).		
5. Curs	sors an	d Trigg	gers	0 A					,						
6. Emb	edded	SQL	-												
7. Proc	edures	, Func	tions a	nd Rej	oort										

# 9. Database Design and implementation with any one front end tool (Mini Project) Sample list of Projects

- 1. Hospital management
- 2. Railway ticket reservation
- 3. Student Mark list processing
- 4. Employee pay roll processing

5. Inventory control

## **TOTAL: 30 HOURS**

## **REFERENCES:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/MIT Press, 2022

2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014

3. ReemaThareja, "Data Structures Using C", Oxford University Press, 2011

4. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 2012

5. Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.

6. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

7. nptel.ac.in/

2302IT352		D	ATAB	ASE N	MANA	GEM	ENT S	YSTI	EMS L	AB		L	Т	P	С
												0	0	2	1
PREREOUI	SITE												•	•	
INEREQUI	51112	•													
	Pro	ogram	ning a	nd Pro	blem S	Solving	. Data	Struct	ures ar	nd Algo	orithms				
		8.4					,, <u>2</u> ata								
COURSE O	BJEC	TIVE	S:												
		1. T	o und	erstand	l the fu	ındame	entals c	f data	model	s and c	concepti	alize a	ind dep	oict a	
		d	latabas	e syste	m usir	ng ER (	liagrar	n							
		$\frac{2.1}{2}$	o mak	e a stu	dy of S	SQL ar	nd relat	ional .	databas	se desi	gn				
		<u>3. 1</u> <u>л</u> т	$\frac{10}{10}$ kno	w abol	it data	storage	e tecnn	iques	a query	/ proce	ssing.	contro	1 toohn	ianas	and
		4. 1 r	ecover	v proc	edures	c III u a	insactio	n pro	CESSIIIE	g, conc	untency	contro		iques	anu
		5. T	To fam	<u>iliarize</u>	the st	udents	with th	ne diff	erent ty	pes of	databa	ses.			
COURSE O	UTCO	<b>)MES</b>	:												
After comple	tion of	f the co	ourse,	Studen	t will	be able	e to								
COI		locaify	, tha m	odorm	and fu	tumiatia	datab		nligatio	ma haa	ad an ai	To and			
	$\frac{1}{2}$ M	lassii y Ian FR	2 mode	$\frac{1}{1}$ to Re	and ru	al mod	$\frac{1}{1}$	se ap	datab	nis Das	ion effe	ze anu	, ,	exity	
CO3	3: A	pply a	ueries	using	norma	lizatio	1 criter	ia and	optimi	ize the	aueries	ouvery			
CO4	l: C	ompar	e and	contras	st vario	ous ind	exing s	trateg	ies in c	lifferer	nt databa	ase sys	tems		
CO5	5: A	pprais	e how	advan	ced da	tabases	differ	from	traditic	onal da	tabases				
		DDIN	0												
COs Vs PO	Ds MA	PPIN	G:												
Г	COs	<b>P</b> O1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	POQ	PO10		2012		
-	CO3	3	2	2	-	-	-	-	-	-	-	-	2		
	CO2	3	2	1	2	-	-	-	-	-	-	-	2		
-	<b>CO3</b>	3	2	2	1	-	-	-	-	-	-	-	2		
	<b>CO4</b>	3	2	2	1	-	-	-	-	-	-	-	2		
	CO5	3	2	2	1	2	-	-	-	-	-	-	2		
COs Vs PS	Os M	APPIN	NG:												
									101						
						US PS	$\frac{\mathbf{01PS}}{2}$	UZPS	505						
						$\frac{101}{102}$	) <u>2</u>		-						
					C	<b>:02</b> 2			-						
					C	<b>O</b> 4 2	2 2	ļ .	-						
					С	2 <b>05</b> 2	2 2		1						
LIST OF EX	<b>KPER</b>	IMEN	TS:												
8. DDL	$\frac{1}{2}$ and $\Gamma$	OML c	omma	nds											
9. Tran	saction	1 contr	ol con	imand	s and a	lggrega	te fund	etions							
10. Joins	and N	vested	Querie	es											
5 High 1	aval n		mina	longua	an out	oncion	(Con	trol at	noturo	Drog	aduraa	and			
J. High I Functions)	ever p	rogran	mining	langua	ige ext	ension	s (Con	lioi su	ucture	s, Proc	edures a	ana			
6. Curso	rs and	Trigge	ers												
7. Ember	dded S	OL													
8. Procee	lures,	Functi	ons an	d Repo	ort										
9. Database	Design	n and i	mplen	entatio	on with	n anv o	ne froi	nt end	tool (N	lini Pr	oject)				
	0		•			2			```		5 /				

#### Sample list of Projects

- 1. Hospital management
- 2. Railway ticket reservation
- 3. Student Mark list processing
- 4. Employee pay roll processing

5. Inventory control

#### **TOTAL: 30 HOURS**

#### **REFERENCES:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, McGraw Hill/ MIT Press, 2022.

Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2014
ReemaThareja, "Data Structures Using C", Oxford University Press, 2011

4. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 2012

5. Michael T Goodrich, Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 8th Edition, Wiley Publishers, 2014.

6 Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.

7. nptel.ac.in/