CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

B.Sc IT:

Those who have joined in the Academic year 2023-24 onwards

Programme outcomes (PO) for B.Sc Information Technology

- Scientific aptitude will be developed in Students
- Students will acquire basic Practical skills & Technical knowledge along with domain knowledge of different subjects in the science & humanities stream.
- Students will become employable; Students will be eligible for career opportunities in education field, Industry, or will be able to opt for entrepreneurship
- Students will possess basic subject knowledge required for higher studies, professional and applied courses
- Students will be aware of and able to develop solution oriented approach towards various Social and Environmental issues.
- Ability to acquire in-depth knowledge of several branches of Mathematics and aligned areas. This Programme helps learners in building a solid foundation for higher studies in Mathematics
- The skills and knowledge gained leads to proficiency in analytical reasoning, which can be utilized in modeling and solving real life problems.
- Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis.
- > To recognize patterns and to identify essential and relevant aspects of problems.
- Ability to share ideas and insights while seeking and benefitting from knowledge and insight of others.
- > Mould the students into responsible citizens in a rapidly changing interdependent society.

The above expectations generally can be pooled into 6 broad categories and can be modified according to institutional requirements:

- PO1: Knowledge
- PO2: Problem Analysis
- PO3: Design / Development of Solutions
- PO4: Conduct investigations of complex problems
- PO5: Modern tool usage
- PO6: Applying to society

Programme Specific Outcomes of B.ScDegree programme in Information Technology

- **PSO1** Demonstrate and apply basic knowledge of information technology to the scientific issues and problems being faced in society and the industry.
- **PSO2** Analyze critical problems and provide computer-based solutions by applying appropriate tools and technology.
- **PSO3** Design and develop solutions to problems in the areas related to web page design, Mobile App development, cloud computing, IOT and data analytics of varying complexity.

CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK B.Sc Information Technology

Part	Courses	Subject	Code	Cr.	Hrs			
	SEMESTER - I							
Ι	Lang. – I	nghJj;jkpo; - I	230103101	3	6			
II	Lang II	General English	231003101	3	4			
	<u>CC</u> – 1	C Programming	232603101	5	5			
III	CC – 2	C- Programming Lab	232603102	3	5			
	EC – I Theory	Digital Logic Fundamentals	232603103	2	2			
	EC-I Practical	Digital Logic Fundamentals Lab	232603104	1	2			
IV	SEC – I(NME)	Fundamentals of IT	234603126	2	2			
W	FC	Problem Solving Techniques	234403126	2	2			
1 V	AECC	Soft Skill – I	236003101	2	2			
	Total			23	30			
		SEMESTER II						
Ι	LangI	nghJj;jkpo; - II	230103201	3	6			
II	LangII	General English	231003201	3	4			
	CC – 3	Java Programming	232603201	4	5			
III	CC - 4	Java Practical	232603202	4	5			
	EC– II	Software Engineering	232603203	3	4			
IV	SEC-II (NME)	Multimedia	234603226	2	2			
	SEC - III	Quantitative Aptitude	234403226	2	2			
	AECC –II	Soft Skill - II	Soft Skill - II 236003201					
				23	30			
	1	SEMESTER III		I	I			
I	LangI	nghJj;jkpo; - III	230103301	3	6			
II	LangII	General English	231003301	3	4			
	CC – 5	Web Application Development	232603301	4	5			
III	CC - 6	Web Application Development Practical	232603302	4	5			
	EC –3	Data Structures and Algorithms	232603303	3	4			
	SEC –IV	Advanced Excel Practical	234403326	1	1			
	SEC – V	PHP Practical	238203326	2	2			
.IV	AECC – III	Soft Skill - III	236003301	2	2			
	EVS	Environmental Studies	234103301	1	1			
				23	30			

Part	Courses		Code	Cr.	Hrs			
	SEMESTER IV							
Ι	Lang. – I	nghJj;jkpo; - IV	230103401	3	6			
II	Lang II	General English	231003401	3	4			
	CC – 7	Resource Management Techniques	232603401	3	4			
	CC - 8	Operating System	232603402	3	3			
III	EC – IV T	Python Programming	232603403	3	3			
	EC – IV P	Python Programming Lab	232603404	2	3			
IV	SEC –VI	Linux Practical	234403426	2	2			
IV	SEC –VII	Cloud Computing	238203426	2	2			
1 V	AECC	Soft Skill - IV	236003401	2	2			
	EVS	Environmental Studies	234103401	1	1			
	Total			24	30			
		SEMESTER V	1					
	CC – 9	Computer Networks	232603501	4	5			
	CC - 10	Database Management System	232603502	4	5			
ш	CC - 11	Database Lab	232603503	4	5			
111	Core 12	Project with Viva Voce	232603504	4	4			
	EC - V	Mobile Computing	232603505	3	5			
	EC - VI	Internet of Things	232603506	3	5			
		Value Education	234303501	1	1			
IV		Internship/Industrial Training(carried out	232603507	2				
		in II year summer vacation)30 hrs	252005507	2				
				25	30			
	1	SEMESTER VI	1	n	T			
	CC – 13	Machine Learning	232603601	4	5			
	CC – 14	Data Analytics	232603602	4	5			
III	CC – 15	Android Programming Theory and	232603603	4	5			
	EC -7	R- Programming Practical	232603604	3	5			
	EC - 8	Computer Graphics	232603605	3	5			
IV	Processional competency skill enhancement course	Logical Reasoning and Technical Skills	234403626	2	4			
		Value Education	234303601	1	1			
V		Extension Activity (outside college hrs)	232603606	1				
				22	30			

Title o	f the Course	WEB AF	PPLICAT	ION DEVI	ELOPM	ENT			
Category	Core 5	Year Semester	· III	Credits	4	C	ourse	232	2603301
Instruction	onal Hours	Lecture	Tutorial	Lab Practice	Total	CIA	Externa	al	Total
рег week		5	-		5	25	75		100
			Learning	g Objective	S				
🖉 Un	derstand how to	develop an	d publish	web pages	using H	ΓML.			
🗷 Lea	arn Cascading St	yle Sheets	(CSS) to a	develop inte	eractive v	web pa	ges.		
🗷 Lea	arn scripting lang	guage to va	lidate web	o page form	s.				
🗷 Lea	arn and understar	nd client-se	erver archi	itecture to d	evelop v	veb pag	ges.		
🗷 Lea	arn XML data for	rmat and u	se XML i	n web page	develop	ment			
UNIT			Deta	ils				Pe	No. of riods for he Unit
	нтмі •							U	le Unit
I	HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line breaks. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment- links tables frames								
п	Forms & Images Using Html:Graphics: Introduction-How to work efficiently with images in webpages, image maps, GIF animation, adding multimedia, data collectionwith HTML forms textbox, password, list box, combo box, text area,tools for building web page front page								
ш	XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)- Accessing HTML & CSS through DCOM Dynamic content styles & positioning Event bubbling data binding								
IV	JavaScript: Client-side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations15								
V	volidations . Ajax: Introduction, advantages & disadvantages, Purpose of it, ajax based web application, alternatives of ajax . Ajava Script & AJAX: Introduction to array operators, making statements-date & time-mathematics- strings-Event handling-form . 15 properties. AJAX. Introduction to jQuery and AngularJS. .						15		

	Course Outcomes						
Course Outcomes	On completion of this course, students will be able;						
CO1	Develop and publish Web pages using Hypertext Markup Language(HTML).						
CO2	Optimize page styles and layout with Cascading Style Sheets(CSS).						
CO3	Analyze and apply the role of languages to create a capstone						
COA	Develop websites using client-side web programmings languages like HTML,						
004	DHTML, CSS, XML, JavaScript, and AJAX.						
CO5	Create web applications using forms and validation of form fields						

	Text Books (Latest Editions)					
1	Pankaj Sharma, "Web Technology", Sk Kataria &SonsBangalore 2011.(UNIT I, II, III & IV).					
2	Achyut S Godbole & Atul Kahate, "Web Technologies", 2002, 2nd Edition. (UNIT					
2	V:AJAX)					
References Books						
	(Latest editions, and the style as given below must be strictly adhered to)					
1	Laura Lemay, Rafe Colburn, Jennifer Kyrnin, "Mastering HTML, CSS & Javascript					
1	Web Publishing",2016.					
n	DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3, JavaScript,					
Δ	XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2ndEdition.					
2	Purewal, Semmy. Learning Web App Development: Build Quickly with Proven					
5	JavaScript Techniques. " O'Reilly Media, Inc.", 2014.					
	Web Resources					
1	https://www.w3schools.com/whatis/default.asp					
2	https://www.edureka.co/blog/web-development-tutorial/					
3	https://www.tutorialspoint.com/website_development/index.htm					

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	S	L	S	L	S	М
CO2	S	М	S	М	S	L
CO3	М	S	L	S	М	L
CO4	М	S	S	S	М	L
CO5	S	S	S	М	М	L

3 – Strong, 2 – Medium , 1 - Low

Title of the	e Course	WEB AI	PPLICAT	ION DEV	ELOPM	ENT]	PRACT	ICA	L
Category	Core 6	Year Semester	II r III	Credits	4	C C	ourse ode	2.	32603302
Instruction	nal Hours	Lecture	Tutorial	Lab Practice	Total	CIA	Exteri	External To	
per week		-	-	5	5	25	75		100
			Learning	g Objective	S				
🗷 Lear	n web page imp	plementation	on using b	asic and ad	vanced I	HTML.			
⊯ Und	erstand the diffe	erence bety	ween Basi	c CSS and A	Advance	d CSS			
💉 Lear	n Scripting lang	guages to i	nteract wi	th the serve	r.				
🗷 Lear	n Forms on the	web page	and form	validation u	ising clie	ent-sid	e scripti	ng.	
🗷 Lear	n web page dev	elopment	using XM	L and AJA	X				
S.No			Li	st of Exerc	ises				
1. Writ sum	e a JavaScript , product, differ	to design rence and q	a simple uotient.	calculator	to perfo	orm the	e follow	ing	operations:
2. Writ outp	e a JavaScript t uts HTML text	that calcula that displa	ates the sq ys the rest	uares and culting value	cubes of es in an H	the nut ITML	mbers fr table for	rom (rmat	0 to 10 and
3. Writ in th "TE	e a JavaScript le interval of 1 XT-SHRINKIN	code that c 00ms in F IG" in BLU	lisplays te ED COL JE color. '	xt "TEXT- OR, when Then the fo	GROWI the font nt size d	NG" w size r ecrease	vith increaches for the second	easir 50pt	ng font size it displays
4. Deve func the s digit	elop and demo tions for the fo string of the left s in the reverse	onstrate an Illowing pr t-most vov order.	n HTML5 oblems: a vel c. Para	5 file that a. Paramete ameter: A m	includes r: A stri umber d	s Java ng b. (. Outp	Script s Dutput: ut: The i	cript The numl	that uses position in ber with its
5. Desi affil Coll Crea	5. Design an XML document to store information about a student in an engineering college affiliated with VTU. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Makeup sample data for 3 students. Create a CSS style sheet and use it to display the document.								
6. Char JQU	nge the Conten ERY Selectors.	t of the w	vebpage us	sing AJAX	. Perfor	m Diff	erent O	pera	tions using
7. Crea field base	7. Create an XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in the MySQL table. Retrieve and display the data based on Name.								
			Course	Outcomes					
Course Outcomes		On cor	npletion of	f this course	e, studen	ts will	be able;		
CO1	Code, debug	& execute	the JavaS	cript progra	ams.				
CO2	Implement w	eb applica	tions in H	TML5 and	JavaScri	pt.			

CO3	Implement CSS & XML applications.				
CO4	Implement AJAX & Jquery.				
COS	Create XHTML applications with MYSQL database.				
Text Books (Latest Editions)					
1	Pankaj Sharma, "Web Technology", Sk Kataria &SonsBangalore 2011.				
2	Achyut S Godbole & Atul Kahate, "Web Technologies", 2002, 2nd Edition				

References Books						
	(Latest editions, and the style as given below must be strictly adhered to)					
1	Laura Lemay, Rafe Colburn , Jennifer Kyrnin, "Mastering HTML, CSS & Javascript					
1	Web Publishing",2016.					
2	DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3, JavaScript,					
Z	XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2ndEdition.					
2	Purewal, Semmy. Learning Web App Development: Build Quickly with Proven					
3	JavaScript Techniques. " O'Reilly Media, Inc.", 2014.					
Web Resources						
1	https://www.w3schools.com/whatis/default.asp					
2	https://www.edureka.co/blog/web-development-tutorial/					
3	https://www.tutorialspoint.com/website_development/index.htm					

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	S	М	S	М	S	М
CO2	М	М	S	М	S	L
CO3	S	S	S	М	М	М
CO4	S	М	М	S	S	М
CO5	М	S	М	М	М	S

3 – Strong, 2 – Medium , 1 - Low

Title of th	ne Course	DATA S	TRUCTU	RES AND	ALGO	RITH	MS		
Category	EC 3	Year	II	Credits	3	C	ourse	23	32603303
Instructio	onal Hours	Semester	Tutorial	Lab	Total		Dae	al	Tatal
per week		Lecture	1 utoriai	Practice	4		Extern	ai	100
		4	- Loarning	 Miective	4	25	/5		100
🗷 Enun	nerate the purpo	se of usag	e of data s	structures a	nd algor	ithms			
🗷 descr	ibe usage of both	n linear and	l non line	ar data struc	ctures or	ganiza	tion		
🗷 Leari	n the data structu	res and alg	orithm im	plementatio	on	C			
🗷 Conc	eptualize the rep	resentation	n of data s	tructures					
🗷 Conc	eive and criticall	y assess th	e given al	gorithm me	thodolo	gies			
UNIT			Deta	ils				No fo	. of Periods or the Unit
	INTRODUCTI	ON TO D	ATA STI	RUCTURE	S:				
	Data Structures:	Definitio	n- Time &	c Space Cor	nplexity	,			
	Arrays: Represe	ntation of	arrays, Ap	plications of	of arrays	, spars	e matrix		
т	and its represent	ation,							12
L	Linear list: Singly linked list implementation, insertion, deletion and								14
	searching operations on linear list								
	Circular linked list: implementation, Double linked list								
	implementation,	insertion,	deletion a	ind searchin	ng operat	tions.			
	STACKS:		1		- 41-				
Π	Operations, array and linked representations of stack,								12
	evaluation, recursion implementation								
	OUFLIES TOP	TES & CD	ADUC.	-					
	QUEUES, IKE	ons on que	ues. array	and linked	l represe	ntatior	IS.		
	Circular Queue: operations, applications of queues.								
III	Trees: Definitions and Concepts- Representation of binary tree, Binary								12
	tree traversals (Inorder, Postorder, preorder).								
	Binary search th	rees.	of Croph	. Tymaa a	faraba	Drac	dth finat		
	Graphs : Representation of Graphs- Types of graphs -Breadth first								
]	INTRODUCTIO	N: Definit	ion of Alg	orithms- O	verview	and in	portance	•	
117	of algorithms,		C				1		12
1.4	Divide-and-Conquer: : General Method – Binary Search- Quick Sort-								14
	Merge Sort.				CUINIC	r			
 	DYNAMIC PRO Dynamic program	JGKAMN nming: Ga	neral met	bod Multier	tage Gra	π nhe Δ	ll naire		
	shortest path. Sin	gle source	shortest r	ath.	uze 010	.рпз, л	ii pans		12
	Backtracking: Ge	eneral meth	nod, 8 Que	eens.					

	Course Outcomes				
Cour	Se On completion of this course, students will be able;				
Outcor	nes				
CO	Understand the concepts of Data structures and simple linear data structures.				
CO	Acquire the skills on the stack data structure, its implementation and application				
CO.	Use the appropriate data structure in context of solution of given problem and demonstrate a familiarity with major data structures.				
CO4	Explore the basic concepts of algorithms				
CO	Analyze the various algorithmic design paradigms like Dynamic Programming, Backtracking, Branch and Bound				
	Text Books (Latest Editions)				
1	1 Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, Second Edition, "Fundamentals of Data in C", Universities Press				
2	E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition, "Fundamentals of Computer Algorithms " Universities Press				
3 Seymour Lipschutz ,"Data Structures with C", First Edition, Schaum's outline serie computers, Tata McGraw Hill.					
	References Books				
	(Latest editions, and the style as given below must be strictly adhered to)				
1	R.Krishnamoorthy and G.IndiraniKumaravel, Data Structures using C, Tata				
-	McGrawHill – 2008.				
2	A.K.Sharma, Data Structures using C, Pearson Education India,2011.				
	Web Resources				
1	https://www.programiz.com/				
2	https://www.geeksforgeeks.org/				
3	https://www.w3schools.in/				

FF										
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6				
CO1	М	S	S	М	S	S				
CO2	М	S	М	М	М	S				
CO3	М	М	S	М	М	S				
CO4	М	М	S	М	М	М				
CO5	S	S	S	S	М	S				

 $3-Strong,\,2-Medium$, 1 - Low

Title of	the Course	ADVAN	CED EX	CEL PRAC	TICAL							
Catagor	SEC IV	Year	II	Credita	1	Course 2344033						
Categor	$\mathbf{y} = \mathbf{SEC} - \mathbf{IV}$	Semester	r III	Creatis		C	ode	254405520				
Instruct	ional Hours	Lecture	Tutorial	Lab Practice	Total	CIA	External	Total				
per wee	<u>×</u>	-	-	1	1	25	75	100				
			Learning	g Objective	S							
🖉 Fa	miliarize with the	constructs	and runn	ing of Exce	l prograi	ns.						
	oply Excel to solv	e financial	problems.	tions sunn	orted by	Evoal						
∠ ∠S	emonstrate the wo	orking of va	LIST OF	FXFRCISE	S	Excel						
1. Writing	g conditional expre	essions (us	ing IF)		0							
2. Using 1	ogical functions (AND, OR,	NOT)									
3. Using	lookup and refere	nce function	ons (VLO	OKUP, HL	OOKUF	P, MAT	TCH, IND	EX) VlookUP				
with Exac	t Match, Approxi	mate Mate	h									
4. Specify	ving a valid range	of values f	or a cell									
5. Specify	ving custom valida	tions base	d on form	ula for a cel	1							
6. Sorting	tables											
7. Pivot ta	ables											
8. Using 1	nultiple-level sort	ing										
9. Filterin	g data for selected	d view (Au	toFilter) U	Jsing advan	ced filter	r option	ıs					
10. Work	ing with Reports											
11. Using	Charts Formattin	g Charts										
.1			Referen	nces Books								
	(Latest editions	s, and the s	style as giv	ven below n	nust be a	strictly	adhered	to)				
1	Alan Murray, Adv		el Success	s A Practica	li Guide	to Mas	tering Exc	el 2020,				
	Apress publisher,	2020	Vualailua	Mianaaf	Errael 2	(5 D.h	le Wilesse	ublications				
2	viichael Alexande		Kusieika	, whereson	Excel 3	UJ B10	ie wney p	uoncations,				
	2022		Wahl	205011P005								
	https://support.mi	crosoft cor	n/en-us/of	fice/video-s	dvanced	l-form	las-and-re	ferences-				
1	2225a2be-7a49-41	fa5-91bb-5	941c2065	3e5			nub unu T					
2	https://corporatefi know/	nanceinstit	ute.com/re	esources/ex	cel/adva	nced-e	xcel-formu	ılas-must-				
3	https://support.mie	crosoft.cor	n/en-us/ex	cel								

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	L	М	S	М	L	S
CO2	S	S	L	М	L	М
CO3	М	L	М	L	М	L
CO4	L	L	S	М	L	S
CO5	М	М	S	S	L	М
	3 -	Strong, 2	2 – Mediu	ım , 1 – L	JOW	

26th ACM – Department of Information Technology – 20.03.2024

Title of	of the Cou	irse	PHP PR	ACTICA	L					
Cateo	ory SI	FC - V	Year	II	Credits	2	(Course	23	8203326
Categ			Semester	· III	Cicuits		0	Code	2.	0203320
Instru per w	Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	Extern	nal	Total
per "	CCK		-	-	2	2	25	75		100
				Learning	g Objective	S				
~ L	To do simple programs in PHP Borform MuSOL Queries through PHP									
Ľ	Serform MySQL Queries through PHP Serform advanced PHP techniques such as File upload, sessions, and authentioations									
			Ι	IST OF	EXERCISI	ES				
01.	Write a	PHP Prog	ram to Pe	rform Stu	ident Mark	sheet u	using	Operator	rs an	d Decision
02.	Write a P	tatements. HP Progra	m to Gene	rate Multi	plication Ta	able usin	ig Iter	rations.		
03.	Write a P	HP Progra	m to Imple	ement Arra	ays.					
04.	Write a P	HP Progra	m to Imple	ement Fun	ctions.					
05.	Write a P	HP Progra	m to Perfo	rm String	Operations	•				
06.	Perform t	he Followi	ing Operat	ions in My	ySQL.					
		(i) Creat	te Databas	e						
		(ii) Drop	Database							
		(iii)Selec	et Database	•						
07.	Perform t	he Followi	ing Operat	ions in My	ySQL.					
	(i)	Create T	ables							
	(ii)	Drop Tal	bles							
	(iii)	Insert Qu	uery.							
08.	Perform t	he Followi	ing Operat	ions in My	ySQL.					
	(i)	Select Q	uery							
	(ii)	"Where"	Clause							
	(iii)	Update (Query							

	References Books									
	(Latest editions, and the style as given below must be strictly adhered to)									
1	Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications,									
	2003									
2	Steve Suchring, "MySQL Bible", John Wiley, 2002.									
3	Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002.									
4	Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001									
5	Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill									
	Publishing Company Limited, Indian Reprint 2009.									
6	Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill									
	Publishing Company Limited, Indian Reprint 2009.									
7	Vikram Vaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw-Hill									
	Publishing Company Limited, Indian Reprint 2009									

Web Resources

- 01. https://www.w3schools.com/php/
- $02. \ https://www.tutorialspoint.com/ebook/python_tutorial/index.asp$

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	L	М	S	Μ	L	S
CO2	S	S	L	М	L	М
CO3	М	L	М	L	М	L
CO4	L	L	S	М	L	S
CO5	М	М	S	S	L	М

 $3-Strong, 2-Medium \ , 1-Low$

Title of t	he Course	RESOU	RCE MA	NAGEME	NT TEC	CHNIQ	UES		
Category	Core 7	Year	II r IV	Credits	3		ourse	23	32603401
Instructi	onal Hours	Lecture	Tutorial	Lab	Total	CIA	Extern	al	Total
per week		4		Practice	4	25	75		100
	Learning Objectives								
This course aims to introduce students to use quantitative methods and techni effective decision –making, model formulation and applications that are used business decision problems.								niq ed i	ues for n solving
UNIT		P	No. of eriods for the Unit						
	Definition of O	R-Develop	oment of	OR-Histor	y of OF	R-Math	ematical		
I	Modelling-Chara	cteristics a	and Phases	s-Tools, Te	chniques	s and N	lethods-		12
	Scope of OR-Use	es of OR.							
	Linear Program	mming P	roblem:	Formulatio	n of L	PP-Ma	nagerial		
	Problems in LPP-Different forms of LPP-Matrix Form, Standard form.								
II	Canonical Form, and Slack and Surplus variables-Graphical solution:								12
	General, No Feas	sible, and U	Jnbounde	d Problems.	š.				
	Solving the Lin	ear Prog	ramming	problem v	with Th	ree va	riables:		
ш	Simplex meth	od-Compu	tational	Procedure	-Artifici	al V	ariables		12
	Technique-Big –M Method with two variables only.								
	Mathematical H	Formulatio	on of Tra	ansportatio	n prob	lem: E	Balanced		
	Transportation P	roblem- U	Inbalance	d Transport	ation Pr	oblem	-Finding		
IV	the initial basic	feasible so	olution – N	North West	Corner	Rule,	Column		12
1,	Minima Method	And Matu	rix Minim	a Method-V	Vogel's	Approx	kimation		12
	Method, Finding Optimality for Transportation problem.								
	Mathematical I	Formulati	on of As	signment	Problen	n: Met	hod for		
	solving the as	signment	problem	-Hungarian	Algori	ithm]	Method-		
V	Balanced assign	nment pro	- blem- U	nbalanced	assignn	nent r	oroblem-		12
	Travelling Salesr	nan Proble	em.		U	1			

	Course Outcomes								
Course Outcomes	On completion of this course, students will be able;								
CO1	Learn about OR, Tools and Methods								
CO2	Formulate the Linear Programming Problem and solve by Graphical method.								
CO3	Discuss with Linear Programming Problems.								
CO4	Gain Knowledge of Mathematical formulation and Transportation Problem								
CO5	Gain Knowledge about Assignment and Travelling Salesman Problem.								

Text Books (Latest Editions)									
1	Resource Management Techniques, Prof.V.Sundaresan,K.S.Ganapathy Subramanian,								
1	K.Ganesan, A.R.Publications.								

	References Books								
(Latest editions, and the style as given below must be strictly adhered to)									
1	1 Arumugam & Issac, Linear Programming Problem, Prentice Hall, 2002								
2	Kanti and Swarap, Manmohan, Operation Research, Harvard unviersity press, 2001.								
3	J.D. Sharma, Operation Research, Prentice hall 2001.								
	Web Resources								
	www.w3schools.blog/linear-programming-introduction.								

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6			
CO1	S	S	S	Μ	Μ	М			
CO2	S	S	S	Μ	Μ	Μ			
CO3	S	S	S	М	Μ	М			
CO4	S	S	Μ	S	Μ	М			
CO5	S	S	Μ	М	S	L			
	3 – S	trong, 2	– Medi	um , 1 -	Low				

Title of t	he Course	OPERA	FING SY	STEM					
Category	Core 8	Year Semester	II · IV	Credits	3	C C	ourse ode	232603402	2
Instructi	onal Hours	Lecture	Tutorial	Lab Practice	Total	CIA	Externa	al Total	
per weer		3	-		3	25	75	100	
			Learning	g Objective	S				
🖉 To	make students	understand	the conce	ept of oper	ating sy	stem.			
🖉 To	understand the	processing	of operat	ing system.				T	
UNIT			Deta	ils				No. of Periods for the Unit	r
	Introduction: W	/hat is an	Operating	g System –	Mainfra	me Sy	ystems –		
	Multiprocessor S	ystems –	Distribute	d Systems	– Cluste	ered Sy	ystems –		
Ι	Real Time Syster	ns.						9	
	Operating System Structures: System components – Operating								
	System Services-								
	Processes: Proc	ess concej	ots - Pro	cess schedu	ılıng –	Opera	tions on		
	process. Threader Overvi	ow Mult	ithread in a	modele T	Threadin		a		
II	CPU scheduling	s. heduling	9						
	algorithms _First_Come First_Served Scheduling _ Shortest Job First								
	Scheduling – Priority Scheduling – Round-Robin Scheduling.								
	Process Synchro	onization:	The Criti	cal-section	problem	– Sen	naphores		
	– Classic prol	0							
111	characterization	9							
	Deadlock Detection – Recovery from Deadlock.								
	Memory Mana	gement: (Contiguou	s memory	allocatio	on – p	oaging –		
IV	Basic Concepts –	- segmenta	tion.		_			9	
	Virtual Memory	: Demand	paging –	Basic Conc	epts -Pa	ge rep	acement		
	File-System Interface: File concepts – Access methods – Directory								
	Structure.								
V	File-System Implementation: Directory implementation – Allocation								
	Allocation	nguous A	nocation	- Liliked	Anocati	011 -	muexed		
	Mass-Storage St	tructure: 1	Disk Struc	ture – Disk	Schedul	ling.			

	Course Outcomes					
Course Outcomes	On completion of this course, students will be able;					
CO1	Get introduced to operating system and its components					
CO2	Learn Processes and process scheduling					
CO3	Understand the Process synchronization and deadlocks					
CO4	Recognize various memory management concepts					
CO5	Get acquainted with file system and disk scheduling					

	Text Books (Latest Editions)							
1	Operating System Concepts, Silberschartz.A, Galvin, Gagne, John Wiley & Sons, Sixth Edition 2007							

	References Books						
	(Latest editions, and the style as given below must be strictly adhered to)						
1	. Operating Systems: Internals and Design Principles, William Stallings, Dorling Kindersley India Pvt. Ltd. 6/E, 2009.						
2	Operating Systems, Davis, Pearson Education, 6th Edition.						
3	Operating Systems – H.M.Deitel, Pearson Education, 2nd Edition, 2005						
	Web Resources						
1	http://bcs.wiley.com/college/bcs/redesign/oinstructor/resource/0,1226,0471250600_BKS_1743_2437_,00.html.						
2	https://oiipdf.com/operating-system-concepts-6rh edition.						
3	https://www.vssut.ac.in/lecture-notes/lecture1423726024.pdf						

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	Μ	S	S	Μ	S	S
CO2	М	S	Μ	М	М	S
CO3	М	М	S	Μ	М	S
CO4	Μ	Μ	S	Μ	Μ	Μ
CO5	S	S	S	S	Μ	S

3 – Strong, 2 – Medium , 1 – Low

Title of t	he Course	PYTHO	N PROG	RAMMINO	J				
Catagora	EC 4	Year	II	Crodite	3	C	ourse	23	2603403
Category	Theory	Semester	r IV	Creatis	5	C	ode	234	2003403
Instructional Hours		Lecture	Tutorial	Lab Practice	Total	CIA	Extern	al	Total
per week		3	-	-	3	25	75		100
			Learning	g Objective	es				
💉 De	scribe the core sy	ntax and s	emantics	of Python p	rogramn	ning la	nguage.		
🗷 Dis	scover the need for	or working	g with the	strings and	function	s.			
💉 Illu	istrate the proces	s of structu	uring the d	lata using lis	sts, dicti	onaries	s, tuples a	and se	ets.
💉 Un	derstand the usag	ge of packa	ages and D	Dictionaries.					
LO2									
UNIT			Deta	ils				Pe t	No. of eriods for the Unit
Ι	Introduction: Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output- Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection.								
п	Iterative Contr Indefinite Loc Manipulations E	ol- While ops-Boolea Building bl	e Stateme in Flag. ocks of py	ent- Infinit String, thon progra	e loops List ai ams, usii	- Def nd D ng rang	finite vs ictionary ges.	,	9
III	Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions							9	
IV	Objects and their use: Software Objects - Turtle Graphics – Turtle attributes- Text Files: Opening, reading and writing text files- String Processing - Exception Handling.							9	
V	Dictionaries and Oriented Progra Polymorphism. functions of pac	l Sets: Dict amming u Python pa kages mat	tionary typ sing Pyth ackages: S plotlib, nu	pe in Pythor on: Encaps Simple prog mpy, panda	n - Set D sulation grams us as etc.	ata typ - Inhe sing th	e. Objec ritance e built-in	t - 1	9

Course Outcomes					
Course	On completion of this course, students will be able;				
CO1	Overview and execute simple Python programs				
CO2	Basic programming concepts in Python				
CO3	Apply various functional strategies for Python-based solutions to real world problems				
CO4	Designing Python data structures using lists, tuples, dictionaries.				
CO5	Performing input/output operations with files in Python.				

	Text Books						
	(Latest editions, and the style as given below must be strictly adhered to)						
1	Charles Dierbach, "Introduction to Computer Science using Python - A computational						
1	Problem solving Focus", Wiley India Edition, 2015.						
2	Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media						
2	2018, 5th Edition						
2	Wesley J. Chun, "Core Python Applications Programming", 3rd Edition, Pearson						
⁵ Education, 2016							
	References Books						
	(Latest editions, and the style as given below must be strictly adhered to)						
1	Python: The Complete Reference Paperback Edition 2018 by Martin C. Brown						
	John Zelle, "Python Programming: An Introduction to Computer Science", Second						
2	edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-						
	1590282410						
	Web Resources						
	https://www.tutorialspoint.com/python/index.htm						
	https://www.w3schools.com/python/						
	https://www.geeksforgeeks.org/python-programming-language/						

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6				
CO1	L	М	S	М	L	S				
CO2	S	S	L	М	L	М				
CO3	М	L	М	L	М	L				
CO4	L	L	S	М	L	S				
CO5	М	М	S	S	L	М				
	3 Strong 2 Medium 1 Low									

3 -Strong, 2 -Medium , 1 -Low

Title	of the	e Course	PYTHON	PROG	RAMMINO	G LAB				
Categ	gory	EC 4 Practical	Year Semester	II IV	Credits	2	(Course Code	2	232603404
Instru	uction	nal Hours	Lecture	Tutorial	Lab Practice	Total	CIA	Extern	nal	Total
per w	CCK		-	-	3	3	25	75		100
	Dase	ribe the core s	intax and se	Learning	g Objective	es rogramn	aina 1	200012000		
r L	\approx Describe the core syntax and semantics of Python programming language. \ll Discover the need for working with the strings and functions.									
Ŕ	Illus	trate the proces	s of structu	ring the d	lata using lis	sts, dictio	onarie	es, tuples	and	sets.
Ľ	Und	erstand the usag	e of packag	ges and L	EXERCISI	7 S •				
1.	Prog depe	ram to convert ending upon use	the given te r's choice.	emperatur	re from Fah	renheit to	o Cel	sius and v	vice	versa
2.	Prog each crite	ram to calculate of the five subj ria:	e total mark ects are to	ts, percent be input l	ntage and gr by user. Ass	ade of a sign grad	stude les ac	nt. Marks cording t	s obt o the	ained in e following
	Grac	le A: Percentage	e >=80	Grac	le B: Percer	ntage >='	70 an	d 80		
	Grac	le C: Percentage	e >= 60 and	<70 G	Frade D: Per	centage	>=40	and <60		
	Gra	de E: Percentag	e < 40							
3.	Prog inpu	ram, to find the transformed to	area of rec om user.	etangle, so	quare, circle	and tria	ngle	by accept	ing	suitable
4.	Writ	e a Python scrip	ot that print	s prime n	umbers less	s than 20				
5.	Prog	ram to find fact	orial of the	given nu	umber using	recursiv	e fun	ction.		
6.	Writ num	e a Python prog bers.	gram to cou	nt the nu	mber of eve	n and od	ld nur	nbers fro	m ar	ray of N
7.	Wri	te a Python clas	s to reverse	e a string	word by wo	ord.				
8.	Give the l	en a tuple and a ist in the tuple.	list as inpu (Input : tup	t, write a le = ('a', '	program to 'a', 'c', 'b', 'd'	count th), list =	e occ ['a', 'b	urrences '], Output	of al t : 3)	ll items of)
9.	Crea inter (Hin	te a SavingsAce est rate and a m t:use Inheritanc	count class tethod that t e).	that beha	ives just like the balance	e a Bank by the a	Acco approj	unt, but a priate am	ulso 1 ount	has an t of interest
10.	. Writ	e a Python prog	gram to con	struct the	e following _j	pattern, ı	using	a nested	loop	,
					*					
					**					

				:	****					
				*	****					
				:	****					

					**					
					*					
								-		

- 11. Read a file content and copy only the contents at odd lines into a new file.
- 12. Create a Turtle graphics window with specific size.
- 13. Write a Python program for Towers of Hanoi using recursion
- 14. Create a menu driven Python program with a dictionary for words and their meanings.
- **15.** Devise a Python program to implement the Hangman Game.

Course Outcomes						
Course Outcomes	On completion of this course, students will be able;					
CO1	Overview and execute simple Python programs					
CO2	Basic programming concepts in Python					
CO3	Apply various functional strategies for Python-based solutions to real world problems					
CO4	Designing Python data structures using lists, tuples, dictionaries.					
CO5	Performing input/output operations with files in Python.					

	References Books						
	(Latest editions, and the style as given below must be strictly adhered to)						
1	1 Python: The Complete Reference Paperback Edition 2018 by Martin C. Brown						
2	John Zelle, "Python Programming: An Introduction to Computer Science", Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1590282410						
	Web Resources						
	https://www.tutorialspoint.com/python/index.htm						
	https://www.w3schools.com/python/						
	https://www.geeksforgeeks.org/python-programming-language/						

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	L	М	S	М	L	S
CO2	S	S	L	М	L	М
CO3	М	L	М	L	М	L
CO4	L	L	S	М	L	S
CO5	М	М	S	S	L	М
	2	G4		. 1 T		

3 – Strong, 2 – Medium , 1 – Low

Title of the Course		LINUX PRACTICAL							
Catagory	SEC – VI	Year	II	Credite	2	C	ourse	234403426	
Category		Semester	r IV	Creatis	۷	C	ode	234403420	
Instructional Hours		Lecture	Tutorial	Lab Practice	Total	CIA	Extern	al Total	
per week		-	-	2	2	25	75	100	
			Learning	g Objective	s				
🖉 To	make students un	nderstand	the concep	ots of Linux					
💉 To	develop based or	n Linux							
C N-			Li	st of Exerc	ises				
5.INO.									
1	Write a shell script to sum of digits								
2	2 Write a shell script to find a given number is Armstrong or not.								
3	Write a shell scri	pt to find the factorial of a given number.							
4	Write a shell script to print a Fibonacci series.								
5	Write a shell script to find out the biggest among three numbers								
6	Write a shell script to implement arithmetic operations								
7	Write a shell script to perform string operations.								
8	Write a shell script to list all the directory files in a directory.								
9	Write a shell script to display list of all files in the current directory with permissions.								
10	10 Write a shell script to find the number of lines in a file that do not contain vowels 'i' o'.						in vowels 'i' or		
11	Write a shell script to find the number of characters, words, and lines in a file.								

References Books							
(Latest editions, and the style as given below must be strictly adhered to)							
1	Dr. Jerry Cooper Stein, "Linux Program Development: Lab Solutions: A Guide with						
	Exercises", Lab Manual Edition Creator Space Publisher, Nov 2009.						
2	Daniel J.Barrett, "Linux Pocket Guide-Essential Commands", 3rd Edition, O'Reilly						
Z	media Inc Publications, 2016.						
3	Richard Peterson, "Linux: The Complete reference", 6 th Edition McGraw Hill, 2016.						
	Web Resources						
1	https://www.macs.hw.ac.uk/-hwloidl/Courses/LinuxIntro/x864.html						
2	https://www.includehelp.com/linux/shell-script-programs-examples.aspx						
3	https://www.tutorialspoint.com/unix/shell_scripting.html						

PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
L	М	S	М	L	S
S	S	L	М	L	М
М	L	М	L	М	L
L	L	S	Μ	L	S
М	М	S	S	L	Μ
	L S M L M	PO1PO2LMSSMLLLMM	PO1PO2PO3LMSSSLMLMLLSMMS	PO1PO2PO3PO4LMSMSSLMMLMLLLSMMMSS	PO1PO2PO3PO4PO3LMSMLSSLMLMLMLMLLSMLMMSSL

3 – Strong, 2 – Medium , 1 - Low

Title of t	he Course	CLOUD	COMPU	TING						
Category	y SEC 7	Year Semester	II IV	Credits	2		Course Code	238203426	5	
Instructi	ional Hours	Lecture	Tutorial	Lab Practice	Total	CIA	Externa	al Total		
per weer	.	2	-		2	25	75	100		
Learning Objectives										
🗷 To	impart fundamer	ntal concept	ts of Clou	d Computi	ng.					
🗷 To pit	To impart a working knowledge of the various cloud service types and their uses and pitfalls.									
∠ To off	To enable the students to know the common features and differences in the service offerings of the three major Cloud Computing service providers, namely Amazon,									
Mi & To	provide know-h	ue. ww of the	various a	spects of a	applicatio	on de	sign, benc	hmarking an	ıd	
UNIT			Deta	ils				No. of Periods for	r	
					6.01	10		the Unit		
I	Introduction to Characteristics o Examples – Clou Cloud Concepts Scalability and E Software Define MapReduce – I Agreements – Bi	f Cloud Con f Cloud Co d-based Ser and Tech Elasticity – d Network Identity an lling.	nputing: omputing rvices and nologies: Deployn ing – N d Acces	Definition – Cloud M d Application Virtualization ent – Replication etwork Function s Manager	of Clou fodels – ons. ion – Lo ication - nction V nent –	d Coi Clou oad ba - Moi 'irtual Servi	alancing – nitoring – lization – ice Level	6		
П	Cloud Services Compute Servic Compute Engine Storage Service Storage - Window Database Servic DB - Google Clo SQL Database - V Application Se Queuing Service Services Content Delivery Analytics Servic Service - Google Deployment and Amazon Cloud F	ces: Amax - Windows s: Amazon ws Azure St es: Amazon oud SQL - O Windows A rvices: Ap s - Email cy Services Network ces: Amazo BigQuery Managen formation	zon Elas Azure V Simple torage n Relatio Google C zure Tab oplication Services S: Amazo n Elastic - Windov nent Servi	stic Compo virtual Mach Storage Se nal Data St loud Data St le Service n Runtimes s - Notific on CloudFr MapReduc vs Azure HI vices: Amag	uter Clo nines ervice - core - Ar Store - V s and tion Ser ront - W e - Goog DInsight zon Elas	oud Goog nazor Vindo Frame vices /indo gle M tic Be	- Google gle Cloud n Dynamo ows Azure eworks - - Media ws Azure apReduce eanstack -	6		
III	Cloud Applicati Cloud Applicati Security – Maim Architectures fo Methodologies: Component Mo Applications, Mc Data Storage Ap Approach (NoSC	ion Design ons – Sca tenance and r Cloud A Service odel, IaaS, odel View C proaches: F QL).	: Introdu lability d Upgrac opplicatio Oriented PaaS Controller Relational	iction – De – Reliabili lation – Pe ons – Clou l Architec and SaaS (MVC), R l Approach	esign Co ty and rformand id Appli cture (Service ESTful V (SQL), 1	nside Avai ce – I icatio SOA) es fo Web S Non-I	ration for lability – Reference n Design), Cloud or Cloud Services – Relational	6		
IV	Cloud Security: Authentication Management – I motion – Key Ma	Introducti (SSO) – Data Securi anagement	on – CS Authori ty : Secu – Auditir	A Cloud S zation – ring data a ng.	Security Identity t rest, so	Arch and ecurir	itecture – l Access ng data in	6		

	Case Studies: Cloud Computing for Healthcare – Cloud Computing for	
V	Energy Systems - Cloud Computing for Transportation Systems - Cloud Computing for Manufacturing Industry - Cloud Computing for	6
	Education.	

Course Outcomes							
Course	rse On completion of this course, students will be able:						
Outcomes							
CO1	To understand the fundamental concepts, various models and services involved in						
COI	Cloud Computing. and have knowledge on Virtualization.						
CO2	To understand the concepts of various cloud services and their implementation in						
02	the Amazon, Microsoft and Google cloud computing platforms.						
CO3	To gain knowledge about designing cloud applications, deployment and data						
	storage services in the cloud.						
CO4	To understand the concepts involved in benchmarking and security on the Cloud.						
CO5	To understand the use case in which the cloud is used in multidisciplinary domains.						

	Text Books (Latest Editions)						
1	Arshdeep Bahga, Vijay Madisetti, Cloud Computing – A Hands On Approach, Universities						
1	Press (India) Pvt. Ltd., 2018.						
ſ	Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing: A Practical						
2	Approach, Tata McGraw-Hill, 2013.						
3	Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd., 2013.						
	References Books						
	(Latest editions, and the style as given below must be strictly adhered to)						
1.	David Crookes, Cloud Computing in Easy Steps, Tata McGraw Hill, 2012.						
2.	Dr. Kumar Saurabh, Cloud Computing, Wiley India, Second Edition 2012.						
	Web Resources						
1.	www.eduonix.com/courses/Software-Development/Learn-Cloud-Computing-from-Scratch-						

1. www.eduonix.com/courses/Software-Development/Learn-Cloud-Computingfor-Beginners

2. www.udemy.com/course/introduction-to-cloud-computing

3. explore.skillbuilder.aws/learn/public/learning_plan/view/82/cloud-foundations-learning-plan

Mapping with Programme Outcomes:								
	PO 1	PO 2	PO 3	PO 4	PO 5	PO6		
CO1	L	М	L	L	L	М		
CO2	S	S	L	М	L	М		
CO3	L	М	S	S	М	L		
CO4	S	М	М	S	S	М		
CO5	S	L	S	М	М	S		

Mapping with Programme Outcomes:

3 – Strong, 2 – Medium , 1 – Low