# Scheme of Examination and Syllabus

For

# Bachelors of Computer Applications Cloud Computing

Batch 2020-2021 Onwards

SGT University, Gurgaon, Haryana

### **Bachelor of Computer Applications (Cloud Computing) - (2020-2021)**

r		1									
Semest er							L	Т	Р	hr/wee k	Credits
Ι	Computer Fundamenta Is 3-0-4 (5)	Computer Network 3-0-2(4)	Programmin g in C++ 3-0-4(5)	Basic Mathematic s 3-0-0 (3)	English 3-0-0(3)		1 5	0	1 0	25	20
Ш	Operating System 3- 0-4(5)	Digital Electronics 3-0-2(4)	Java Programmin g 3-0-4(5)	Discrete Mathematic s 3-0-0(3)	Communicati on and Soft Skills 3-0-0(3)		1 5	0	1 0	25	20
		SWAYA	M <sup>#</sup> Course-I (Du	ring 1year)							Accordin g to no. of week devoted
Ш	Data Structure 3-0-2(4)	Computer Architecture and Organizatio n 3-0-0(3)	Cloud computing 3-0-2(4)	Algorithm Design 3-0-0(3)	Software Engineering 3-0-0(3)	Open Electiv e I 3- 0-0(3)	1 8	0	4	22	20
IV	Formal Language & Automata Theory 3-0-0(3)	Database Managemen t System 3-0-2(4)	Advance Cloud Computing 3-0-4(5)	Web Programmi ng 3-0-2(4)	Computer Graphics 3-0-2(4)		1 5	0	1 0	25	20
		SWAYAN	# 1 Course -II(Dur	ring 2 <sup>nd</sup> year)							Accordin g to no. of week devoted
V	Advance Storage Managemen t 3-0-2(4)	IoT developme nt application of Cloud 3-0-2(4)	Cyber Security 3-0-0 (3)	Programmi ng in Python 3-0-2(4)	Capstone Project (Minor) 0-0-4(2)	Open Electiv e II 3- 0-0(3)	1 5	0	1 0	25	20
VI	Artificial Intelligence 3-0-2(4)	Capstone Project (Major) 0-0-8(4)	Hadoop 3-0-2(4)	Enterprise Mobile Application Developme nt 3-0-2(4)	Design and Development application of Cloud 3-0-2(4)		1 2	0	1 6	28	20
		SWAYAM	I <sup>#</sup> Course -III(Du	ring 3 <sup>rd</sup> year)							Accordin g to no. of week devoted
120								Total (	Credit		

Open Elective-I			Т	Р	С
13450306	Foreign Language German Language-I	3	0	0	3
13450307	Professional Communication Skills	3	0	0	3
13450308	Industrial Safety Engineering	3	0	0	3
13450309	Urban water resource management	3	0	0	3

Open Elective-II			Т	Р	С
13450505	Foreign Language-II	3	0	0	3
13450506	Personality and Career building	3	0	0	3
13450507	Air and Noise Pollution	3	0	0	3
13450508	Sensors and Architecture Interfacing	3	0	0	3

## **Special Note:**

**OE:** Open Elective

(\*): Students with Non-Computer background will be given this course.

(#): Swayam courses during SI,II and III years are optional and will have credits according to no. of weeks i.e. 4 weeks= 1 credit, 8 weeks= 2 credits and 12 weeks= 3 credits.

(#): Students need to choose a course from the list duly approved by BoS for current academic year/ semester.

(#): Credits will be considered only after successful submission of Certificate provided by the host institute of SWAYAM course.

**@:** Internship mentioned will be mandatory in IV-B for all students. Internship Program can be taken either inhouse or outside in industry, final discretion resides with university authorities.

**OE:** Students can register for any one of the course from the list of Open Elective offered by various faculties at SGT University, faculties, list will be shared at start of each semester

(\$): Summer training after 2<sup>nd</sup> semester is optional. But it will be considered for credits if training has been started with prior approval from the department and Proper completion certificate mentioning duration of training will be submitted by students from some reputed industry of their domain.

## SGT University, Gurgaon, Haryana

Subject									
Code	Title	$\mathbf{L}$	Т	Р	Total	Int	Ext	Total	Credits
13450101	Computer Fundamentals	3	-	-	3	40	60	100	3
13450102	Computer Network	3	-	-	3	40	60	100	3
13450103	Programming in C++	3	-	-	3	40	60	100	3
13450104	Basic Mathematics	3	-	-	3	40	60	100	3
13450105	English	3	-	-	3	40	60	100	3
13450106	Computer Fundamentals Lab	-	-	4	2	60	40	100	2
13450107	Computer Network Lab	-	-	2	1	60	40	100	1
13450108	Programming in C++ Lab		-	4	2	60	40	100	2
	Total	15	-	10	20	380	420	800	20
	Bachelor of Computer A	Applicat	ions	Clou	ıd Compu	iting Se	emeste	er – II	
Paper									
	Title	L	Τ	P	Total	Int	Ext	Total	Credits
Code									
13450201	Operating System	3	-	-	3	40	60	100	3
13450202	Digital Electronics	3	-	-	3	40	60	100	3
13450203	Java Programming	3	-	-	3	40	60	100	3
13450204	Discrete Mathematics	3	-	-	3	40	60	100	3
13450205	Communication and Soft Skills	3	-	-	3	40	60	100	3
13450206	Operating System Lab	-	-	4	2	60	40	100	2
13450207	Digital Electronics Lab	-	-	2	1	60	40	100	1
13450208	Java Programming Lab	-	-	4	2	60	40	100	2
	Total	15	-	10	20	380	420	800	20

## Scheme of Bachelor of Computer Applications (Cloud Computing) for Batch 2020 onwards Bachelor of Computer Applications Cloud Computing Semester – I

# SGT University, Gurgaon, Haryana

## Scheme of Bachelor of Computer Applications for Batch 2020 onwards Bachelor of Computer Applications Semester – III

Paper									
	Title	L	Τ	P	Total	Int	Ext	Total	Credits
Code									
13450301	Data Structure	3	-	-	3	40	60	100	3
13450302	Computer Architecture and Organization	3	-	-	3	40	60	100	3
13450303	Cloud Computing	3	-	-	3	40	60	100	3
13450304	Algorithm Design	3	-	-	3	40	60	100	3
13450305	Software Engineering	3	-	-	3	40	60	100	3
13450310	Cloud Computing Lab	-	-	2	2	60	40	100	1
13450311	Data Structure Lab	-	-	2	2	60	40	100	1
	Open elective -I	3	-	-	3	40	60	100	3
	Total	18	-	4	22	360	440	800	20
	Bachelor of Computer	·Ap	pli	catio	ons Seme	ster -	- IV	•	•
	<b>_</b>		Ē						
Paper									
_	Title	L	Т	Р	Total	Int	Ext	Total	Credits
Code									
13450401	Formal Language & Automata Theory	3	-	-	3	40	60	100	3
13450402	Database Management System	3	-	-	3	40	60	100	3
13450403	Advance Cloud Computing	3	-	-	3	40	60	100	3
13450404	Web Programming	3	-	-	3	40	60	100	3
13450405	Computer Graphics	3	-	-	3	40	60	100	3
13450406	Computer Graphics Lab	-	-	2	2	60	40	100	1
13450407	Database Management System Lab	-	-	2	2	60	40	100	1
13450408	Web Programming Lab	-	-	2	2	60	40	100	1
13450409	Advance Cloud Computing lab	-	-	4	4	60	40	100	2
					•			•	
	Total	15	-	10	25	440	460	900	20

# SGT University, Gurgaon, Haryana

## Scheme of Bachelor of Computer Applications (Cloud Computing) for Batch 2020 onwards Bachelor of Computer Applications (Cloud Computing) Semester – V

Paper Title LT Р Total **Ext** Total Credits Int Code 13450501 Advance Storage Management \_ \_ 13450502 IoT development application of Cloud --13450503 Cyber Security \_ -13450504 Programming in Python \_ \_ 13450509 Capstone Project (Minor) \_ Open Elective II \_ \_ Advance Storage Management Lab \_ \_ IoT development application of Cloud \_ Lab Programming in Python Lab \_ \_ Total -**Bachelor of Computer Applications Semester - VI** Paper Т Р Title L Total Int Ext Total Credits Code Artificial Intelligence Hadoop \_ \_ Enterprise Mobile Application on \_ \_ Development Design and Development application of cloud Capstone Project (Major) \_ \_ Artificial Intelligence Lab \_ \_ Hadoop Lab \_ \_ Enterprise Mobile Application on \_ Development Lab Design and Development application of cloud lab **Total** -

1. Name of the Depar	tment- Computer S	Science & Engineering				
2. Course Name	Computer	L	Т	T I		
	Fundamentals	-			_	
3. Course Code	13450101	3			4	
4. Type of Course (us	e tick mark)	Core (V)	<u>PE()</u>	0.11	<b>OE</b> ()	Г
5. Pre-requisite (if	Computer Basics	6. Frequency (use	Even	Odd	Either	Every Som ()
7 Total Number of L	ectures Tutorials	Practical (assuming 12	U weeks of	(•) f one sem	ester)	Selli ()
7.1000100000000000000000000000000000000	cetures, rutoriais,	Tutorials $= 0$	Practice	$\frac{1}{2} = 0$	uster)	
8. Course Description	l		Tucuc	ui – v		
Course introduces to f	undamental concept	ts of computer; students	will learn	to use M	licrosoft o	office
applications: word pro	cessing program (M	S word), A spreadsheet	orogram (	MS Exce	el) and a	
presentation program (	MS Power point). C	Course intended for stude	nts requi	ring hand	s on know	wledge
of computer applicatio	ns.					
9. Learning Objectiv	ves:					
• To aware stude	nts about computer,	its functions and utilities	•			
• To promote the	development of con	mputer-related skills for	immediat	e applica	tion to ot	her
curricular areas	1	1 1 .				
<ul> <li>To provide a fo</li> <li>To facilitate the</li> </ul>	undation for post-se	econdary education.	lyin a alri	Ile in star	lanta	
• 10 facilitate the	$(\mathbf{CO}_{\mathbf{S}})$	ipplication of problem-sc	orving ski	IIS III SLUG	lents.	
The students w	ill be able to:-					
<ul> <li>Describe the us</li> </ul>	age of computers ar	nd why computers are es	sential co	mnonent	s in busin	less and
society.	age of computers a	id willy computers are est		mponent	5 m ousin	css and
Identify catego	ries of programs, sy	stem software and applic	ations. O	rganize a	nd work	with
files and folder	s.	11		U		
• Describe variou	is types of networks	s network standards and c	communi	cation so:	ftware.	
11. Unit wise detailed	content					
Unit-1	Number of					
	lectures = 9					
Introduction to Comp	uters: History of d	evelopment of Compute	ers, Coi	mputer s	ystem co	ncepts ,
Characteristics Capabi	lities and limitation	is, Generations of Comp	uters. Vo	on Neuma	ann Arch	itecture,
Classification of Comp	buters, Instruction E $I \subset O$ Devices Mar	Execution Cycle, Basic C	DOM D	$\frac{1}{1}$	omputer s	system
- Collitor Ullit, ALU,	I/ O Devices, Men	101 y - KAIVI, KOIVI, EF	KOM, F	KUM, FI		lory and
Types of Software – S	vstem software. An	plication software. Utility	v Softwa	re Demo	ware Sh	areware
Freeware, Firmware,	Free Software. • O	perating Systems – Fun	ctions. T	vnes – F	Batch Pro	cessing.
Single User, Multi Us	er, Multiprogramm	ing, Multi-Tasking. • Pi	ogrammi	ing langu	ages – N	Aachine,
Assembly, High Level, 4 GL. • Data representation in computers. Computer Viruses. Disk Operating						
System (DOS) • Introduction, History & Versions of DOS. DOS basics • Physical structure of disk,						
drive name, FAT, file	& directory structure	e and naming rules, boot	ing proce	SS		
<b>Unit</b> – <b>2</b>	Number of					
	lectures = 9					
PC Maintenance and	Troubleshooting:	Opening the PC and id	entificati	on. Stud	y of diffe	erent
blocks, Assembling a	nd disassembling.	Basic Device Configur	ation and	1 Installa	tion-Prin	iters,
Introduction to Com	, wonner Board, S	moments of Mother he	u, tips ( ards & :	on trout	Ports S	ung. lots
muouucion to comp	uter Haruware, CO	inponents of Mothel-00		is types,	10115, 5	1015,

Connectors, add on cards, Power supply units, and cabinet types. Storage devices: Primary & Secondary storage medium. Introduction to servers and network security Types of servers: Files servers, Email Servers, Proxy servers etc. Basics of Internet and Intranet: Types of Internet connections: Dialup, Broadband, Leased Line, Wi-Fi, Wi-Max, 2G, 3G, 4G, WWW, E-mails, Search Engines, Social Networking. Cloud application. Audio video conferencing, VOIP

Unit – 3	Number of
	lectures = 9

Windows: features of windows — desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows. Entertainment – CD Player, DVD Player, Media Player, Sound Recorder, Volume Control.. **MS Word:** Introduction to Word processing, Names of some commonly used word processing software. Introduction to MS-Word: Feature, document creating, formatting, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents. Spell Check, Thesaurus, Find & Replace, Inserting Header, Footer, page number & pictures. Working with Tables.

Unit – 4	Number of	
	lectures = 9	

**MS-Excel**: Definition And Advantages of Electronic Worksheet, Working On Spreadsheets: Cell Referencing, Range & Related Operations, Setting, Saving And Retrieving Worksheet File, Inserting, Deleting, Copying And Moving of Data Cells, Inserting And Deleting Rows & Columns, Copying, inserting, Renaming the sheet of workbook. General Short-cut commands, Entering text and numeric data, Entering date and time different functions, formatting text and numeric data. Functions and Other Features: Classification and Usage of Various Built-In-Functions In Worksheet, Passwords, Protecting A Worksheet Printing of the worksheet, page margin setting and adding header and footer, Transferring Data to and From Non Worksheet Files, Database handling, Creating names and executing macros, creating graphs

**MS Power Point**:- Auto -wizard, creating a presentation using Auto content wizard, Blank presentation, creating, saving and printing a presentation, adding slide to a presentation, slide view, outline view, slide sorter view, notes view and slide show view. Changing text font and size, selecting text style and color, to set header and footer. Using, bullets, clipart and word art gallery. Applying design template creating graph. Adding transitions and Animation effects, setting timings for slide show preparing note pages, preparing audience handouts

## 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

#### 13. Books Recommended

#### **Text Books**

• P.K. Sinha, Fundamentals of Computers, BPB Publications

#### 14. Reference Books

- V. Rajaraman, Fundamentals of Computers, 3rd Edition, PHI Publications
- Anita Goel, Computer Fundamentals, Pearson Education.
- Computers Today, D. H. Sanders, Fourth Edition, McGraw Hill, 1988
- Marmel, Elauue, MS Office Projects 2007, Wiley India

1. Name of the Depar	tment- Computer S	Science & Engineering		
2. Course Name	Computer	L	Т	Р
	Fundamentals			
	Lab			
	12450107	0	0	4
3. Course Code	13450107			4 OF ()
4. Type of Course (us	e lick mark)	Core (* )	PE()	<b>UE</b> () Fither Every
5. Fre-requisite (ii		o. rrequency (use tick marks)	$\begin{array}{c c} E \text{ven} & \text{Odd} \\ \hline \\ \hline \\ \end{array} \\ \begin{pmatrix} \checkmark \\ \end{pmatrix} \\ \begin{pmatrix} \checkmark \\ \end{pmatrix}$	Sem () Sem ()
7. Total Number of L	ectures. Tutorials.	Practical (assuming 12	weeks of one sen	ester)
Lectures = $0$		Tutorials = $0$	Practical = 36	
8. Course Description	: Course introduce	e to use of Microsoft offi	ce applications: w	ord processing
program (MS word	l), A spreadsheet pro	ogram (MS Excel) and a	presentation progr	cam (MS Power
point). Course inter	nded for students rea	quiring hands on knowle	dge of computer a	pplications.
9. Learning objectiv	es:			
• To aware stude	nts about computer,	its functions and utilities		
• To promote the	development of con	mputer-related skills for	immediate applica	tion to other
curricular areas				
• To provide a fo	undation for post-se	econdary education.	1 . 1	1
• To facilitate the	e development and a	ipplication of problem-so	olving skills in stu	dents.
10 Course Outcomes	$(\mathbf{CO}_{\mathbf{r}})$			
The students will be ab	(COS):			
• Describe the us	age of computers ar	nd why computers are es	sential component	s in husiness and
society	age of computers at	id willy computers are es	sential component	s in business and
<ul> <li>Identify categor</li> </ul>	ries of programs, sy	stem software and applic	ations. Organize a	and work with
files and folder	8.			
Describe variou	s types of networks	s network standards and o	communication so	ftware.
	•1			
11. List of Experimen	ts			
1. Assembly and o	disassembly of a De	sktop Computer with con	nnections.	
2. Operating Syste	em Installation-Forr	natting, Partitioning		
3. Additional Har	dware Installation II	Ke printer, mobile, scann	ler. Writing	
5 To connect two	PC's using the inte	rconnecting devices and	transfer the data h	etween them
6 To study variou	is connections and r	orts used in computer co	mmunication PS	$\frac{1}{2}$ port and its
specification. V	GA Port and its spe	ecification. Serial port an	d its specification	and applications.
Parallel Ports a	nd its specification,	USB Port and its specific	cation, RJ45 conn	ector, DVI
Monitor port.	· /	1		
7. To study variou	is cards used in a Co	omputer System. (Ethern	et Card, Sound Ca	urd,
Video/Graphics	s Card, Network Inte	erface card ,TV Tuner Ca	ard, Accelerator ca	ard)
8. MS WORD				
Adding text, ed	iting text, finding an	nd replacing text, format	ting text, character	r/line/paragraph
spacing, working	ng with styles and te	ext indentation.		
Saving docume	nt with and without	password.		
Working with p	page layout, page se	tup i.e. setting margins,	changing page siz	e, changing page

orientation and applying page background.

- Printing a document.
- Inserting page numbers, headers and footers, footnote, endnote, date and time, pictures, objects, shapes etc.
- Creating bulleted and numbered lists.
- Working with tables, paragraphs and columns.
- Reviewing (track changes, adding comments etc.) and proof reading a document i.e. spell check, grammar etc.
- Creating and working with table of content.
- Mail merge.

## 9. MS EXCEL

- Entering data, formatting data i.e. applying borders, various formats (currency formats, number formats etc.), fonts etc.
- Creating custom lists, using auto fill, find and replace and editing text (cut, copy, paste and paste special).
- Working with formulae and functions.
- Applying conditional formatting to data.
- Sorting and filtering data (auto and advanced filter).
- Performing Subtotals.
- Working with charts (2D and 3D).
- Adding comments, applying password protection to the workbook.
- Working with page layout and printing options.

## **10. MS POWERPOINT**

- Creating and formatting slides in a presentation.
- Create a master slide with a logo, footer, and font.
- Add notes to each slide.
- Insert a graphic or picture.
- Implement a background.
- Place a text box in the title slide with your name.
- Insert transitions for each slide.
- Applying various effects (custom animation and transitional effects) in a presentation.
- Adjust text alignment in the title slide so it is centered.
- Printing the slides of a presentation

## 12. Brief Description of self-learning / E-learning component

https://office.live.com/start/Word.aspx

https://office.live.com/start/Excel.aspx

https://office.live.com/start/PowerPoint.aspx

The students will be encouraged to learn using Virtual Link. Please add VLink

1. Name of the Depar	tment: - Computer	· Science & Engineering	3						
2. Course Name	Computer	L	ТР						
	Networks								
3. Course Code	13450102	3	0		2				
4. Type of Course (us	e tick mark)	Core $()$	<b>PE()</b>		<b>OE</b> ()				
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every			
any)		tick marks)	0	(√)	Sem ()	Sem			
				P		()			
7. Total Number of Lectures, Tutorials, Pfactical (assuming 14 weeks of one semester)									
Lectures = $30$		1 utoriais = 0	Practica	al = 0					
8. Course Description	l:	notworks noolest switch	ing large	nod onobi	to otumo o				
The structure and comp	ponents of computer	antrol local area nature	mig, laye	arcini	lectures,	EDDI)			
physical layer, error congest	ion control quality	of service multicast	IKS (EUR	ennet, 10	ken King,	FDDI),			
<b>0 I</b> earning objectiv		of service, multicast							
<b>5.</b> Learning objectiv	ution of computer	network concepts							
<ul> <li>Discuss the evo</li> <li>Understand the</li> </ul>	structure of computer	er networks factors affe	cting cor	nnuter ne	otwork				
deployment.	structure of comput	ter networks, factors are	cting con	iiputer ne	TWOIK				
<ul> <li>Describe emerged</li> </ul>	ging technology in th	ne net-centric computing	area and	assess th	neir				
current capabili	ties, limitations and	potential applications.							
<ul> <li>Program and ar</li> </ul>	alyse network proto	ocols, architecture, algor	ithms and	l other sa	fety critic	al			
issues in real-li	fe scenario.								
<b>10. Course Outcomes</b>	:								
• Examine and an	nalyze various proto	cols like transport-layer	concepts	: Transpo	ort-Layer	services			
-Reliable vs. ur	-reliable data transf	er -TCP protocol -UDP	protocol						
• Examine and an	halyze the network-	layer concepts like Netw	ork-Laye	r services	s –Routin	g -IP			
protocol -IP ad	dressing					T			
• Examine and an	halyze the different	link-layer and local area	network	concepts	like Link	-Layer			
services –Ether	net - Token Ring -E	rror detection and correc	tion -AR	P protoco	01				
• Analyze and im	plement application	n of network system.							
11. Unit wise detailed	content		1 41	0 1					
Unit-1	Number of	Title of the unit: Intro	duction	Concept	S				
Cools and Application	1000000000000000000000000000000000000	ionly structure and archite	oturo Th	00 00 m	foronaa m	odal			
services Network Ton	ology Design - Dela	or Analysis Back Bone l	Design I		Acc Netw	ork			
Design Physical I aver	• Transmission Med	ia Switching methods I	SDN Te	rminal H	andling	JIK			
Unit - 2	Number of	Title of the unit: Med	ium Acce	ess sub la	aver				
Unit - 2	lectures – 8				-,				
	icetures – o								
Medium Access sub la	yer - Channel Alloc	ations, LAN protocols - A	ALOHA J	protocols	- Overvie	ew of			
IEEE standards - FDD	I. Data Link Layer -	Elementary Data Link H	Protocols,	Sliding	Window				
protocols, Error Handl	ing.								
Unit - 3	Number of	Title of the unit: Netw	ork Lay	er					
	lectures = 9					(10.15			
Network Layer - Point	- to Pont Networks,	routing, Congestion cor	trol Inter	metworki	ng - TCP	/ IP, IP			
packet, IP address, IPv	D.		<b></b>						
Unit - 4	number of	1 Itle of the unit: I ran	sport La	iyer					

lectures = 9	
Transport Layer - Design issues, connection management, session Layer-Design issues, remote	
procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TC	P -
Window Management.	
File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application.	
Example Networks- Internet and Public Networks.	
12. Brief Description of self learning / E-learning component	
Online Video Lectures on computer networks	
Practice of networking algorithims	
13. Text Books Recommended	
1) -Data Communication and Networking by B. A. Forouzen, TMH, 4 <sup>th</sup> Edition, 2017	
14. Reference Books Recommended	
1) Computer Networks, A.S. Tanenbaum, Pearson Education, 5th Edition, 2013	
2) Data and Computer Communication, W. Stallings, Pearson Education, 10th Edition, 2013	
3) -Essential of TCP/ IP∥ G. Shanmugarathinam, Firewall Media, 2008	

1. Name of the Department: - Computer Science & Engineering										
2. Course Name	Computer	L	Т		Р					
	Networks Lab									
3. Course Code	13450107	0	0	0 2						
4. Type of Course (use tick mark)		Core $()$	<b>PE()</b>		<b>OE</b> ()					
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every				
any)		tick marks)	0	()	Sem ()	Sem				
						0				
7. Total Number of L	7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)									
Lectures = 0 Tutorials = 0 Practical = 18										

## 8. Course Description:

The structure and components of computer networks, packet switching, layered architectures, TCP/IP, physical layer, error control, window flow control, local area networks (Ethernet, Token Ring; FDDI), network layer, congestion control, quality of service, multicast

## 9. Learning objectives:

- Discuss the evolution of computer network concepts.
- Understand the structure of computer networks, factors affecting computer network deployment.
- Describe emerging technology in the net-centric computing area and assess their current capabilities, limitations and potential applications.
- Program and analyse network protocols, architecture, algorithms and other safety critical issues in real-life scenario.

## **10. Course Outcomes:**

- Examine and analyze various protocols like transport-layer concepts: Transport-Layer services -Reliable vs. un-reliable data transfer -TCP protocol -UDP protocol
- Examine and analyze the network-layer concepts like Network-Layer services –Routing -IP protocol -IP addressing
- Examine and analyze the different link-layer and local area network concepts like Link-Layer services –Ethernet -Token Ring -Error detection and correction -ARP protocol
- Analyze and implement application of network system.

## 11. Lab detailed content:

Experiment of the following will be implemented

## LIST OF EXPERIMENTS:

1. Introduction to basic Linux networking commands. (Commands like ipconfig, getmac, tracert, pathping, arp, ping, netstat, finger etc.)

- 2. Implement bit stuffing and de-stuffing
- 3. Write a program for hamming code generation for error detection and correction.
- 4. Implement cyclic redundancy check (CRC).
- 5. Write a program for congestion control using the leaky bucket algorithm.
- 6. Implement Dijkstra's algorithm to compute a shortest path through graph.
- 7. Take a 64-bit plain text and encrypt the same using DES algorithm.
- 8. Using RSA algorithm encrypts a text data and decrypts the same.
- 9. Implementation of the link state routing protocols.
- 10. Implementation of LZW compression and decompression algorithms.

Name of the Departm	ent Computer S	cience & Engineering				
1. Course Name	Basic Mathematics	L	,	Г	]	P
2. Course Code	13450104	3		0	(	0
3. Type of Course (us	e tick mark)	Core (✓)	P	E()	O	E ()
4. Pre-requisite (if	+2 Mathematics	5. Frequency (use	Even	Every		
any)		tick marks)	() (✓) Sem			
					(1st)	
6. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks o	f one sen	nester)	
Lectures = 36		Tutorials = 0	Practic	al = 0		
7. Course Description	1:					
In this course students	will teach about ma	trix, Set function and rel	ations, P	rincipal o	of Mathem	natical
Induction. After compi	lation of these topic	students also focus on s	ome diff	erent topi	ic basic st	atistics
and its applications & s	solution of linear eq	uations.				
To extend student's mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems. Main focus to develop logical and analytical skills of BCA students. <b>Course Outcomes (COs):</b> After successful completion, students should be able to:				e d be		
<ul> <li>Use correct marprepared for fut</li> <li>Mathematics th</li> <li>In order to solv and then interpret</li> </ul>	thematical terminole ture coursework in b at requires the use of e the problems using ret and clearly comm	bgy, notation, and symbo pusiness and daily life. of and an understanding o g multiple approaches, ju nunicate the results.	olic proce of the cou idge if th	esses in o ncepts of le results	rder to be algorithm are reason	nable,
9. Unit wise detailed of	content	Γ				
Unit-1	Number of	Set theory				
	lectures = 09				<u> </u>	•
Set relations and func diagram, operations on trigonometric functions	s.	set, methods of describ ction and difference of so	oing a so et, Dualit	et, types y, partitio	of set, Noning of a	enn set,
Unit – 2	Number of	Matrix and PMI				
	lectures = 09					
Binomial theorem and matrix; evaluation of d	principle of mathen eterminant, minor a	natics induction, Introduced nd cofactors and propert	ction to n ies of det	natrix, pro erminant	operties o	f
Unit – 3	Number of	Basic Statistics				
	lectures $= 09$					
Statistics: introduction Probability: Definition	to statistics, collect, conditional probab	ion, and tabulation of dat ility, Baye's application	a, mean, s and its	median a uses.	and mode	
Unit – 4	Number of	Linear Equations				
	lectures = 09	1				
Linear Equations- Trar	slating algebraic ex	pressions, combining lik	e terms s	solving li	near equa	tions:
Addition property. Sol	ving linear equation	s: Multiplication propert	y, combi	ning rule	s. Literal	
equations. Solving line	ar inequalities.		-	-		

Systems of Linear Equations - Systems of equations in two variables (addition/elimination).Graphing Linear Equations - Linear equations in two variables. The Cartesian coordinate system. The graph of a linear equation, Slope Point-slope form of a line graphing linear inequalities.

#### **10. Brief Description of self-learning / E-learning component**

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

#### 11. Books Recommended

**Text Books** 

1. Refresher Course On Mathematics Vol: 2--- Manjit Singh

#### **Reference Books**

1. ABC Of Mathematics J.P Mahendru.

- 2. Discrete Mathematical Structure with application to Computer Science, Tremblay J.P.and Manohar R, McGraw Hill.
  - 3. Applied Discrete Structure of Computer Science, Doerr A & Kenneth L., Paperback Edition, Galgotia Publications.

1. Name of t	the Depar	rtment :- Computer	Science & Engineering	5			
2. Course N	ame	English	L	Т-		Р-	
3. Course C	ode	13450105	3	0		0	
4. Type of C	Course (us	se tick mark)	Core $()$	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requi	site (if	English at +2	6. Frequency (use	Even	Odd	Either	Every
any)		level	tick marks)	0	(√)	Sem ()	Sem ()
7.Total Nun	iber of L	ectures, Tutorials, P	Practical (assuming 14	weeks of	one sei	nester)	
Lectures = 3	86		Tutorials = 0	Practical = 0			
8. Course de	escription	1					
This course	emphasize	es the fundamental la	nguage skills of reading,	, writing,	speakin	ng, listeni	ng,
thinking and	viewing	and presenting.					
The develop	ment read	ling and writing skills	is a major emphasis of	the cours	e.		
9. Learning	objective	es:					
• To en	nhance the	e communication skil	ls in a effective manner				
• To de	evelop co	mmunication skills as	s well as positive person	ality trait	S		
• To en	nhance us	age of English vocab	ulary and grammar				
• To m	ake stude	ents competent in prof	fessional and technical c	ommunic	cation		
10.Course C	Outcomes	(COs):					
• Able	to comm	unicate and expand th	e knowledge of commu	nication.			
• Able	to comm	unicate in English con	nfidently				
• Able	to improv	ve pronunciation and	accent				
• Able	to improv	ve reading and writing	g skills				
11.Unit wise	e course d	letails:	5				
Unit-1	Init-1 Number of lectures = 9 Title of the unit: Effective Communication						
0							
Introduction	to Comm	unication: Types of C	Communication. Process	of Com	nunicat	ion. Func	tions of
Communicat	ion, Barr	iers to Communicatio	on and ways to overcome	e the barr	iers to c	communic	ation.
	,		5				
Unit - 2	Number	r of Lectures=9	Title of the unit: Conv	versation	Skills	&	
			<b>Presentational Skills</b>				
Greetings an	d introdu	cing oneself, Framing	g questions and answers,	Role pla	y, Buyi	ng: asking	g details
etc. Word fo	etc. Word formation strategies, vocabulary building. One word substitution. Antonyms, Synonyms,				nyms,		
Homophone	s, Homon	yms, Strategies for ef	fective presentation, Im	portance	of Bod	y Languas	ge in
Presentation	entation. Visual Aids. Podium Panic. Pronunciation.				J		
Unit - 3	Number	r of lectures = 9	Title of the unit: Read	ling Con	nprehei	ision and	L
			Pronunciation				
Simple narra	tion and s	stories, Simple Passag	ges, Newspaper and artic	cles clipp	ings, Pı	onunciati	on:
Syllable, Str	ess, Inton	ation and Modulation			U /		
Sentences ty	nces types. Tenses. Phrases and Clauses. Parts of speech. Formal grammatical categories				S.		
Articles, Pre	positional	phrases, Phrasal ver	bs	U		U	,
Unit - 4	Number	r of lectures = 9	Title of the unit: Writ	ting Com	prehen	sion:	
				0	•	-	
0		T // TTT !/!		CT ···	<b>F</b>	CT	D ( '
Correct the s	entences,	Letter Writing, Brief	introduction to Types o	t Letter,	Format	of Letter,	Précis
writing, Par	agraph W	riting, Report Writing	g, Difference between R	eport and	1 Propos	sal	

## 12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal:

https://elearning.sgtuniversity.ac.in/course-category/general/

## 13. Books Recommended (3 Text Books + 2-3 Reference Books)

i) Improve your Writing, V.N. Arora, Lakshmi Chandra, Oxford University Press, New Delhi 2014

ii)	Fluency In English II,	Promodini Varma	, Mukti Sanyal,	OUP India 2006
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iii) Communication Skills in English, D. G. Saxena and Kuntal Tamang, Top Quark, 2011

iv) Complete Course in English, Robert J. Dixson PHI Private Limited 2009

- **v)** Effective Technical Communication M Asharaf Rizvi Tata McGraw Hill Education Private Limited 2005
- v) English Grammar in Context, R K Agnihotri and A L Khanna Ratna Sagar 1996

vi) Professional Communication, Malti Agrawal Krishna Educational Publishers 2013

1. Name of the Depar	tment:- Computer	Science Engineering				
2. Course Name	Programming	L	Т		Р	
	in C++					
3. Course Code	13450103	3	0 4			
4. Type of Course (us	e tick mark)	<b>Core</b> ((✓)	<b>PE()</b>	1	<b>OE</b> ()	
5. Pre-requisite (if	С	6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)	()	(✓)	Sem ()	Sem ()
7. Total Number of L	ectures, 1 utorials,	Practical (assuming 14	Weeks of	$\frac{1}{2}$ one sem	lester)	
$\frac{1}{8} Course Description$	•	1 utorials = 0	Practica	aI = 0		
Students learn how to y	write programs in ar	object-oriented high les	vel progra	mming l	anguage	Topics
covered include proble	m solving program	ming concents classes a	nd metho	ds contr	aliguage. ol structu	res
arrays, and strings.	in sorving, program	ining concepts, clusses a	na metno	us, contro	or structu	105,
9. Learning Objectiv	ves:					
• To Know the B	asics Of Programm	ing				
• To understand l	how to use program	ming in day to day Appli	ications.			
10. Course Outcomes	(COs):					
• Knowledge of p	programminglangua	ge.				
• Be aware about	t OOP'sconcept.					
• Basic understar	nding onprogrammi	ng.				
11. Unit wise detailed	content	-				
Unit-1	Number of					
	lectures = 9					
Introduction: Object or	riented programming	g, characteristics of object	ct orienta	ted langu	ages, clas	sses,
C++ basics: Program S	tatements, Variable	s and constants, Loops a	nd Decisi	ions.		
<b>Unit</b> – 2	Number of					
Enertienen Definingen	lectures = 9		- 1			
Functions: Defining a l	function, function at	guments & passing by v	alue, arra	iys & pon	nters,	
Classes & Objects: Det	fining class class co	instructors and destructor	rs operat	or overlo	ading	
Unit – 3	Number of	instructors and destructo	is, opera		aung.	
emt 5	lectures $= 9$					
Class Inheritance: Deri	ived class & base cla	ass; Virtual, Friends and	Static fur	nctions; I	nheritanc	e
and its types, Polymorp	phism.					
Exception Handling: T	ry Throw, Catch, Tl	nrowing an Exception, C	atching a	n Except	ion.	
Unit – 4	Number of					
	lectures = 9					
Function Templates, O	verloading Templat	e Functions, Class Temp	plate, Clas	ss Templa	ates and N	Non-
Type Parameters, Ter	mplates and Inherr	tance, Templates and I	Friends,	Template	es and S	tatic
Input/output files: Stree	ame huffers & jostr	eams header files redire	action fil	e innut a	nd output	
12 Brief Description	of self-learning / F	-learning component		e input a	iu output	
The students will be en	couraged to learn u	sing the SGT E-Learning	o nortal a	nd choose	e the relev	vant
lectures delivered by su	ubject experts of SG	T University.	- Portur u			
The link to the E-Learn	ning portal.	·····				
https://elearning.sgtuni	versity.ac.in/course	-category/				
Journal papers; Patents	in the respective field	eld.				

#### 13. Books Recommended

#### **Text books:**

1. Object Oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill, New Delhi.

#### **Reference books:**

- 1. Object Oriented Programming in Turbo C+ + by Robert Lafore, Pearson Education, New Delhi.
- 2. The Complete Reference in C++ by Herbert Schildt, 2002, TMH, New Delhi.
- 3. Object Oriented Programming Using C++ by Kamthane, Pearson Education, New Delhi.
- 4. C + + How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall, India, New Delhi.

1. Name of the Depar	tment- Computer S	Science & Engineering				
2. Course Name	Programming	L	Т		Р	
	in C++ Lab					
3. Course Code	13450108	0	0		4	
4. Type of Course (us	e tick mark)	<b>Core</b> (✓))	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)		(✓)	Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 14	weeks o	of one sen	nester)	
Lectures = 0		Tutorials = 0	Practic	cal = 36		
8. Course Description	1					
9. Learning objectiv	es:					
To understand	fundamentals of pro	gramming such as varial	bles, con	ditional a	nd iterativ	ve
execution, meth	nods, etc.					
To understand	fundamentals of obj	ect-oriented programming	ng in Java	a, includi	ng definir	ıg
classes, invokir	ng methods, using cl	lass libraries, etc				
• To have the abi	lity to write a comp	uter program to solve sp	ecified p	roblems		
<b>10. Course Outcomes</b>	(COs):					
• Understand the	features of C++ sup	porting object oriented	program	ming		
Understand the	relative merits of C	++ as an object oriented	program	ming lan	guage	
• Understand th f	eatures of C++ supp	porting object oriented p	rogramm	nimng		
• Understand the	relatives merits of (	C++ as an object oriente	d program	nmimg la	inguage	
11. List of Experimen	ts					
1. Simple C++ program	ns to implement var	ious control structures.				
a. if statementb. switch	case statement and	do while loop				
c. for loopd. while loop	)					
2. Programs to underst	and structure & unio	ons.				
a. structure b. union						
3. Programs to underst	and pointer arithmer	tic.				
4. Functions & Recurs	lon.					
a. recursion b. function	1					
5. Inline functions.						
6. Programs to underst	and different function	on call mechanism.				
a. call by reference b. c	all by value					
7. Programs to underst	and storage specifie	rs.				
8. Constructors & destr	ructors.					
9. Use of -this pointer	using class					
10. Programs to implement	nent inheritance and	d function overriding.				
a. multiple inheritance	–access Specifiers					
b. hierarchical inheritar	nce – function over	riding /virtual Function				
11. Programs to overlo	ad unary & binary o	operators as member fun	ction &n	on memb	er	
function.						
a. unary operator as me	ember function					
b. binary operator as no	on member function	l				
12. Programs to unders	stand friend function	n & friend Class.				

a. friend Function b. friend class

13. Programs on class templates

14. Using a C++ program check whether a student passed the exam or not based on total mark which shall be above 40%

15. Create a C++ program which takes two distances in inch-feet system and stores in data members of two structure variables. Then, this program calculates the sum of two distances and displays it.

## 12. Brief Description of self-learning / E-learning component

http://vlabs.iitb.ac.in/vlabs-dev/labs/oops/index.php

### Semester-II BCA-Cloud Computing

1. Name of the Department- Computer Science Engineering								
2. Course Name	Digital	L	Т		P			
	Electronics							
3. Course Code	13450202	3	0		0 2		2	
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE() OE (</b>		<b>OE</b> ()			
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every		
any)		tick marks)	<b>(√)</b> )		Sem ()	Sem ()		
7. Total Number of L	ectures, Tutorials,	Practical (assuming 14	weeks of	f one sem	ester)			
Lectures = 36		Tutorials = 0	Practical = 0					
8. Course Description								
To acquire the basic knowledge of digital logic levels and application of knowledge to understand								
digital abortranias circuits 2. To prenero students to perform the analysis and design of various digital								

digital electronics circuits. 2. To prepare students to perform the analysis and design of various digital electronic circuits.

## 9. Learning objectives:

- To give the idea about fundamental properties of semiconductors.
- To prepare students to perform the analysis of any Analog electronics circuit.
- To empower students to understand the design and working of BJT / FET amplifiers, oscillators and Operational Amplifier.
- To prepare the students for advanced courses in Communication system Circuit Design.

## **10.** Course Outcomes (COs):

- Acquire basic knowledge of physical and electrical conducting properties of semiconductors
- To learn function of basic digital circuits and use of transistors to create logic gates in order to perform Boolean logic
- To learn different theorems for simplification of basic Digital electronics circuits
- Student understand symbols, Truth tables, Boolean equations, & working principle
- Develop the skill to build, and troubleshoot Analog circuits

20:010p the sh	in to cunu, unu trouc	
11. Unit wise detailed	content	
Unit-1	Number of	
	lectures = 09	
Digital system and bin	ary numbers: Signed	binary numbers, binary codes, cyclic codes, error
detecting and correctin	g codes, hamming co	odes. Gate-level minimization: The K-map method up to
five variable, don't ca	are conditions, POS	simplification, NAND and NOR implementation,
QuineMc-Clusky meth	od (Tabular method)	
<b>Unit</b> – 2	Number of	
	lectures = 09	
Combinational Logic:	Combinational circu	its, analysis procedure, design procedure, binary adder-
subtractor, decimal add	der, binary multiplier	, magnitude comparator, decoders, encoders, multiplexers
,demultiplexers		
Unit – 3	Number of	
	lectures = 09	
Synchronous Sequenti	al logic: Sequential c	ircuits, storage elements: latches, flip flops, analysis of
clocked sequential circ	uits, state reduction	and assignments, design procedure. Registers and
counters: Shift register	s, ripple counter, syr	nchronous counter, other counters
Unit – 4	Number of	
	lectures = 09	

Memory and programmable logic: RAM, ROM, PLA, PAL. Design at the register transfer level: ASMs, design example, design with multiplexers. Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race Free State assignment, hazards

### 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

Journal papers; Patents in the respective field.

## 13. Books Recommended

## **Text Book:**

1. R.P. Jain , --Modern digital electronics , New edition , TMH Publication.

## **REFERENCE BOOKS :**

1. Grout - Digital Design using FPGA'S & CPLD's, Elsevier

2. F. Vahid: Digital Design: Wiley Student Edition

3. J. F. Wakerly, Digital Design Principles and Practices, New Edition, Prentice-Hall.

4. R. L. Tokheim, Digital electronics, Principles and applications, 6th Edition, Tata McGraw Hill New Edition.

5. M. Morris Mano and M. D. Ciletti, -Digital DesignI, New Edition, Pearson Education

6. Digital Design and computer organization: Nasib Singh Gill & J. B. Dixit

1. Name of the Departmen	t- Computer S	Science & Engineering				
2. Course Name Dig	ital	L	7	Г	1	D
Elec	ctronics Lab	L		L	-	
3. Course Code	13450207	0	(	)		2
4. Type of Course (use tick	k mark)	$Core(\checkmark))$	PH	£()	O	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
7 Total Number of Leatur	og Tutorials	UCK Marks) Proctical (assuming 12		fonosom	Sem ()	Sem ()
7.10tal Number of LectureLectures = 0	les, rutorials,	Tutorials $= 0$	Practice	$\frac{1}{2} = 18$	lester)	
8 Course Description			Tache	ai – 10		
To acquire the basic kno	wledge of digi	tal logic levels and appli	cation of	knowled	ge to und	erstand
digital electronics circuit	ts. 2. To prepar	re students to perform the	e analysis	and desi	gn of var	rious
digital electronic circuits	s.	• statemes to periori in	• ••••••		<b>B</b> <sup>11</sup> 01 / <b>M</b>	10 005
9. Learning objectives:						
• To give the idea abo	ut fundamental	l properties of semicondu	actors.			
• To prepare students	to perform the	analysis of any Analog e	electronic	s circuit.		
• To empower student	ts to understand	l the design and working	of BJT /	FET am	olifiers.	
oscillators and Oper	ational Amplifi	ier	,		,	
To prepare the stude	ents for advance	ed courses in Communic	ation syst	em Circu	it Design	
10 Course Outcomes (CO			ation syst		in Design	
Acquire basic knowl	bledge of physic	al and electrical conduct	ing prope	ortios of s	emicondi	ictors
To learn function of	basic digital ci	regists and use of transist	ors to cre	ate logic	gates in a	order
to perform Boolean	logic			ale logie	gates in t	Juci
• To learn different the	eorems for sim	plification of basic Digit	al electro	nics circi	iits	
Student understand s	symbols. Truth	tables. Boolean equation	18. & WOI	king r	orinciple	
<b>11. List of Experiments</b>	<u> </u>	<b>I</b>	.,	6 1	· r	
I.						
1. Testing of AND Gate						
2. Testing of NAND Gate						
3. Testing of OR Gate						
4. Testing of NOR Gate						
5. Testing of XOR Gate						
6. Sum of Product						
7. Product of Sum						
8. Half Adder Using Logic (	Gates					
9. 1 Bit Full Adder Using L	ogic Gates					
10. Implementation of Book	ean Functions	using MUX				
11. BCD - to – Seven Segm	ent Display					
12. J-K Flip Flop						
13. Up Counter						
14. Shift register						
15. 10 study a BCD to / Seg	ginent LED dis	бріаў				
12. <u>IIUP://WWW.VIAD.CO.11/</u> https://www.jitg.ac.ip/os	seweh/vlah/Dio	rital-System-Lab/experin	nente nhr			
<ul> <li>11. BCD - to – Seven Segment</li> <li>12. J-K Flip Flop</li> <li>13. Up Counter</li> <li>14. Shift register</li> <li>15. To study a BCD to 7 Segment</li> <li>12. <a href="http://www.vlab.co.in/">http://www.vlab.co.in/</a></li> <li>http://www.vlab.co.in/</li> </ul>	gment LED dis	play	nents she			

## Semester-II BCA-Cloud Computing

1. Name of t	the Depa	rtment : Centre for	Languages and Comm	unication			
						•	
2. Course N	ame	Communication	L	Т		Р	
		and Soft Skills					
3. Course C	ode	13450205	3	0		0	
4. Type of C	Course (u	se tick mark)	Core $()$	<b>PE(</b> )		<b>OE</b> ()	
5. Pre-requi	isite (if	English at +2	6. Frequency (use	Even	Odd	Either	Every
any)		level	tick marks)	(√)	0	Sem ()	Sem ()
7.Total Nun	nber of L	ectures, Tutorials, I	Practical (assuming 14	weeks of	one se	mester)	
Lectures $= 3$	36		Tutorials = 0	Practica	<b>l</b> =		
8. Course D	escriptio	n l (C l l			C		<i>.</i> .
The course h	lelps to le	arn about formal and	informal communicatio	n, strategi	es for	communi	cation
and now to t	be an advo	scate for yourself using	ng communications				
9. Learning	objective	es:					
• En	hancing l	istening-speaking Sk	ills				
• En	hanceme	nt of Vocabulary and	Pronunciation Skills.				
• En	hanceme	nt of Debating Skills	which will further enhan	nce public	speak	ing Skills	
• Inc	duce Read	ling and Thinking ab	ility	I	1	0	
• En	hancing s	kills pertaining to ind	dustrv				
		8 ··	j				
10.Course C	Outcomes	(COs):					
•	Able to	convey their ideas in	an expressive and effec	tive way			
•	Able to	speak confidently be	fore the audience				
•	Able to	get a holistic indust	ry perspectives				
•	Able to	think out of the box a	and express				
•	Able to	write effectively					
11.Unit wise	e course d	letails:					
Unit-1	Number	r of lectures = 09	Title of the unit: Busi	ness Com	imunio	cation Sk	ills:
Business Co	mmunica	ation: Meaning and	Definition. Its Impo	rtance. P	rocess.	Types.	Channels.
Principles of 1	Effective	Communication and	Barriers to Communicat	tion.	,	- JP - 2,	,
1							
Unit - 2	Number	r of Lectures= 09	Title of the unit: List	ening Skil	lls		
Listonin a S		former of hoters on I int	aning and Haaring Dam	iona to Eff	la ativo	T istanin a	
Listening S Listening Ex	ercises	ierence between List	ening and Hearing, Barr	iers to En	ective	Listening	,,
Unit - 3	Number	r of lectures = 09	Title of the unit: Spea	aking Skil	lls		
Just a Minut	e, Extemp	oore, Group Discussio	ons Sessions Simple Pas	sages and	Storie	s, Newspa	aper and
articles clipp	oings, Pro	nunciation: Syllable a	and Stress. Sentence, Te	nses, Phra	ses and	d Clauses	, Parts of
speech. Form	nal gramn	natical categories, Ph	rasal verbs				

Unit	- 4	Number of lectures = 09	Title of the unit: Vocabulary Building and Sentence Syntax
Prep	aration	of Presentation, Strategies for	Effective Presentation, Technical Words, Antonyms,
Syno	nyms, A	Active Passive, Narration, Trai	nsformation of Sentences, Sentence Correction.
12. B	rief De	scription of self learning / E-	learning component
The s	tudents	will be encouraged to learn us	ing the SGT E-Learning portal and choose the relevant
lectur	es deliv	vered by subject experts of SG	T University.
The l	ink to t	he E-Learning portal:	
https:	//elearr	ing.sgtuniversity.ac.in/course-	category/general/
13. B	ooks R	ecommended (3 Text Books -	+ 2-3 Reference Books)
iv)	Imp	rove your Writing, People S	Skills For Business: Essential Tools to Improve Your
	Com	munication Skills and Relatior	nships at Work. Kindle Edition, Melissa Contreras
V)	Flue	ncy In English II, Promodini	Varma, Mukti Sanyal, OUP India 2006
vi)	Con	munication Skills in English	, D. G. Saxena and Kuntal Tamang, Top Quark, 2011
vi)	Con	plete Course in English, Rob	ert J. Dixson PHI Private Limited 2009
vii)	Effe	ctive Technical Communicat	ion M Asharaf Rizvi Tata McGraw Hill Education Private
	Limi	ted 2005	
V)	Englis	sh Grammar in Context, R K	Agnihotri and A L Khanna Ratna Sagar 1996
vi)	Profes	sional Communication, Malti	i Agrawal Krishna Educational Publishers 2013

1. Name of the Depart	tment- Computer S	Science Engineering			
2. Course Name	Discrete	T	т	р	
	Mathematics	L	I	I	
3. Course Code	13450204	3	0	0	
4. Type of Course (us	e tick mark)	<b>Core</b> (✓))	<b>PE()</b>	<b>OE</b> ()	
5. Pre-requisite (if	Basic	6. Frequency (use	Even Odd ()	Either Eve	ery
any)	Mathematics	tick marks)	(✔)	Sem Ser	m ()
				(1st)	
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of one sen	nester)	
Lectures = 36		Tutorials = 0	Practical = 0		
8. Course Description	•				
Introduction to discrete	e structures and their	r applications like logic,	gate and set theor	y, recursive	
programming, digital lo	ogic and combinator	rial circuits, real number	representation an	d finite automa	ata
used in computer scien	ce.				
9. Learning objectives	S:				
To provide basic and the	neoretical competen	cies that is majorly used	in Computer Scie	nce. To help	
students understand and	d appreciate the bas	ic mathematical knowled	lge which is fund	imental to	
Computer Science. Ma	in focus to develop	logical and analytical ski	ills of BCA stude	nts.	
Course Outcomes (CO	<b>Js):</b> After successfu	il completion, students sl	nould be able to:		
<ul> <li>Appreciate mathem to communicate.</li> <li>Use correct mathem for future coursew</li> <li>Mathematics that in In order to solve the then interpret and</li> <li>Determination of the truth tables.</li> <li>10. Unit wise detailed</li> <li>Unit-1</li> <li>Relations and Function properties of relations;</li> </ul>	matics concepts that matical terminology ork in business and requires the use of a he problems using n clearly communicat the logical equivalen <b>content</b> <b>Number of</b> <b>lectures = 09</b> as: basic definitions injective, surjective	are encountered in the re- y, notation, and symbolic daily life. and an understanding of t multiple approaches, judg the the results. Ince of propositions and the <b>Functions and Relation</b> of relations and function and bijective functions,	eal world, underst processes in orde he concepts of alg e if the results are he validity of form ms s, graphics of rela composition	and and be able or to be prepare orithm. reasonable, and hal arguments tions,	le ed nd via
Unit - 2	Number of	Recursion and recurre	ence		
Doouncion and re-	1ectures = 09	ny face of recording		alations and	
somecommon recurren	urrence: The ma	iny faces of recursion	i, recurrence, r	elations, and	
	Number of	Combinations & Logi	a Cata		
$\operatorname{Umt} - 3$	Number of	Combinations & Logi	c Gale		
Combinations: Pula	$\frac{1}{1}$	tions combinations			
Algebra of I orige Dro	nositions and logic	operations truth tables of	nd propositions	nerated by set	
equivalence and implic	eation laws of logic	mathematical system or	nd propositions of	er a universe	,
mathematical induction	$\Delta$ notications of P	$\Delta$	hing Theory (usin	$\alpha \Delta ND \Omega D \alpha$	nd
NOT gates) The Korne	augh Man method	oonan Aigeora to Switch	using Theory (usin		nu
Inor gates). The Kallia	Number of	Cranh Theory			
0mt <b>- 4</b>					

lectures = 09
Graph Theory – Definition of (undirected) Graphs and Trees,. And their properties. Trees, Spanning
Trees. Minimal Spanning Trees and Kruskal's Algorithum. Matrix Representations of Graphs.
Weighted undirected Graphs.
11. Brief Description of self-learning / E-learning component
The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant
lectures delivered by subject experts of SGT University.
The link to the E-Learning portal.
www.youtube.com/watch?v=7k4Di5u-oUU&index=12&list=PL0862D1A947252D20
www.youtube.com/watch?v= BIKq9Xo_5A&index=13&list=PL0862D1A947252D20
www.youtube.com/watch?v=RMLR2JHHeWo&list=PL0862D1A947252D20&index=14
www.youtube.com/watch?v=fZqfkJ-cb28&list=PL0862D1A947252D20&index=17
www.youtube.com/watch?v=Fk8nJjzohr8&index=22&list=PL0862D1A947252D20
12. Books Recommended
Text Books
2. Baburam, Discrete Mathematics, Pearson Education 2010
Reference Books
1. Discrete Mathematics , M.K. Venkataraman, The National Publishing Company.
<ol> <li>Discrete Mathematical Structures with Applications to Computer Science J.P. Trembly and Manohar, Tata McGraw-Hill Publications.</li> </ol>
3. Elements of Discrete Mathematics, Liu, Tata Mac Graw Hills.

1. Name of the Depart	tment- Computer S	Science & Engineering				
2. Course Name	Java	L	Т		I	D
2 Comme Code	Programming	-	0			4
<b>5.</b> Course Code	13450203	$\frac{3}{Coro}(\mathbf{x})$	U DE	0		•
5 Pre-requisite (if	e tick mark)	6  Frequency (use	Even	$\frac{0}{0}$	Fither	- U Every
any)		tick marks)	$(\checkmark))$	0	Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	one sem	ester)	V
Lectures = 36		Tutorials = 0	Practica	<b>l</b> = <b>0</b>		
8. Course Description						
This course of study builds on the skills gained by students in Java programming Students will						
design object-oriented	applications with Ja	va and will create Java p	rograms u	ising har	nds-on, e	ngaging
0 Loorning objective	0.6.					
• This module giv	es: ves students the skil	ls and knowledge to und	erstand ia	va nrogr	ammina	
<ul> <li>How to write Ia</li> </ul>	wa code according t	to Object-Oriented Progr	amming n	rinciples	ammig.	
<ul> <li>How to write se</li> <li>How to design (</li> </ul>	GUI applications an	d Applets using AWT $\square$	unning p	meipie	,	
10. Course Outcomes	(COs):					
Describe Java c	oncepts					
• Identify various	s data types					
Evaluate variou	is java concept using	g programs				
11. Unit wise detailed	content					
Unit-1	Number of lectures = 09					
Importance and featu	res of Java: Introd	uction to JVM .Language	e Construc	t of iava	includin	g
Keywords, constants, v	variables and looping	g and decision making co	onstruct, C	Classes a	nd their	0
implementation, Introd	uction to JVM and	its architecture including	set of inst	tructions		
Introducing classes, o	bjects and method	s: defining a class, addin	g variable	s and m	ethods,	
creating objects, constr	uctors, class inherit	ance.				
Arrays and String: Ci	reating an array, one	e and two dimensional ar	rays, strin	g array a	and metho	ods
Unit – 2	Number of					
	lectures = 09					
<b>Exception Handling:</b>	Fundamentals except	otion types, uncaught exc	eptions, the	hrow, th	row,	
final, built in exception	, creating your own	exceptions,		-		
Multithreaded Progra	amming: Fundamer	itals, Java thread model:	priorities,	synchro	onization,	
messaging, thread class	ses, Runnable interi	ace, inter thread Commu	nication, s	suspendi	ng, resum	nng
Init – 3	Number of					
emt 5	lectures = 09					
Input/Output Program	mming: Basics, Stre	eams, Byte and Characte	r Stream,	predefin	ed stream	ns,
Reading and writing fro	om console and file	s. Networking: Basics, r	networking	g classes	and inter	rfaces,
using java.net package,	, doing TCP/IP and	Data-gram Programming	g, RMI (Re	emote M	lethod	
Invocation).						
Unit – 4	Number of lectures – 00					
Event Handling. Diffe	erent Mechanism th	e Delegation Event Mod	el Event	Classes	Event	
Lient Hunding, Diff.	som meenamoni, u	ie Delegation Event Mou		C103503,	Livent	

Listener Interfaces, Adapter and Inner Classes, Working with windows, Graphics and Text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video, Java Applet.

## **The Collection Framework:** The Collection Interface, Collection Classes, Working with Maps & Sets.

### 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

### 13. Books Recommended

#### **Text Books**

1. Patrick Naughton and Herbertz Schildt, —Java-2: The Complete Referencell, TMH, Tenth edition

#### **Reference Books**

1. E. Balaguruswamy, -Programming with Java: A Primer<sup>II</sup>, McGraw-Hill; Sixth edition, 2019.

2. Core Java: An Integrated Approach, New: Includes All Versions upto Java 8, R. Nageswara Rao, DreamTech Press, 2016.

1. Name of the Department- Computer Science & Engineering								
2. Course Name	Java Programming Lab	L	Т		Р			
3. Course Code	13450208	0	0		4			
4. Type of Course (use tick mark)		Core (✔))	PE() OF		E ()			
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every		
any)		tick marks)	(✔) ()		Sem ()	Sem ()		
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)								
Lectures = 0 Tutorials = 0 Practical = 36								

### 8. Course Description

The course emphasis programming in the Java programming language and knowledge of objectoriented paradigm in the Java programming language make the students expertise the use of Java in a variety of technologies and on different platforms.

## 9. Learning objectives:

- How to write Java code according to Object-Oriented Programming principles
- How to design GUI applications and Applets using AWT

### **10.** Course Outcomes (COs):

- Describe Java concepts
- Identify various data types
- Evaluate various java concept using programs

## **11. List of Experiments**

- 1. Make a java Program to check even or Odd Number
- 2. Implement Function overloading concept.
- 3. Fibonacci Series in Java
- 4. Prime Number Program in Java
- 5. Palindrome Program in Java
- 6. Factorial Program in Java
- 7. Write a program to implement the concept of inheritance having a base class representing a person, derived from this class make two classes, one about the students and other about employees. Input & output this information about students & employees.
- 8. Create an Applet Creating Thread which will move a String Continuously.
- 9. Make a program using applets which will handle mouse events on client side.
- 10. Make a program using applets which will handle key events on client side.
- 11. Make a program using servlets and a web page using HTML so as to print the dynamic response from the servlets when the web page is submitted.

List of projects:

- Payment Billing
- Library Management System
- Fee Management

## 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using Virtual Link.

1.Name of the Department- Computer Science Engineering								
2.Course Name	Operating	L	Τ		Р			
	Systems							
3.Course Code	13450201	3	0		4			
4.Type of Course (use tick mark)		<b>Core</b> ((✓)	<b>PE()</b>	PE() OF				
5.Pre-requisite (if		6.Frequency (use	Even	Odd ()	Either	Every		
any)		tick marks)	(✔))		Sem ()	Sem ()		
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)								
Lectures = 36		Tutorials = 0	Practical = 0					
8 Course Description								

This course will introduce the core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output device management and security.

### 9. Learning objectives

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn to implement simple OS mechanisms

#### **10.Course Outcomes (COs):**

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

#### 11.Unit wise detailed content

11.0mt wise uctailed	content					
Unit-1	Number of					
	lectures = 9					
		2		_	2.2	

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

		 	_	~	
	lectures = 9				
Unit – 2	Number of				

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time,

Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Unit – 3	Number of
	lectures = 9

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Unit – 4	Number of
	lectures = 9

Memory Management: Basic concept, Logical and Physical address map, Memory allocation:

Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

## 12.Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

### **13.Books Recommended**

#### Text book:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

## **Reference books:**

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing

2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, AddisonWesley

3. Design of the Unix Operating Systems, 8 th Edition by Maurice Bach, Prentice-Hall of India 4.

Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates 5. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of

India.

1.Name of the Depart	ment- Computer S	cience Engineering				
2.Course Name	Operating	L	Т		Р	
	System Lab					
3.Course Code	13450206	0	0		4	
4.Type of Course (use tick mark)		<b>Core</b> ((✓)	<b>PE()</b>		<b>OE</b> ()	
5.Pre-requisite (if		6.Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectures =0		Tutorials = 0	Practical = 36			

## 8. Course Description

Unix and other OS based exercises to practice/simulate: Scheduling, Memory management Algorithms, Concurrent programming, Use of threads and processes, Kernel reconfiguration, Device drivers and systems administration of different operating system.

## 9. Learning objectives

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn to implement simple OS mechanisms

## **10.Course Outcomes (COs):**

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

## **11.List of Experiments**

- 1. Basics of UNIX commands.
- 2. Shell programming
- 3. Implementation of CPU scheduling. a) Round Robin b) SJF c) FCFS d) Priority
- 4. Implement all file allocation strategies
- 5. Implement Semaphores
- 6. Implement File Organization Techniques
- 7. Implement Bankers algorithm for Dead Lock Avoidance
- 8. Implement an Algorithm for Dead Lock Detection
- 9. Implement the all page replacement algorithms a) FIFO b) LRU c) LFU

- **10.** Implement Shared memory and IPC
- 11. Implement Paging Technique f memory management.
- 12. Implement Threading & Synchronization Applications

## 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using Virtual Link.

1. Name of the Depar	tment: - Computer	Science Engineering					
2. Course Name	Data Structure	L	Т		Р		
3. Course Code	13450301	3	0		4		
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()		
5. Pre-requisite (if	C Language	6. Frequency (use	Even	Odd	Either	Every	
any)		tick marks)	0	(•)	Sem ()	Sem ()	
7. Total Number of L	ectures, Tutorials, I	Practical (assuming 12 w	eeks of o	one semes	ster)		
Lectures = 36		Tutorials = 0	Practic	al = 0			
8. Course Description	l						
The course focuses on	basic and essential to	opics in data structures, in	cluding a	rray-base	d lists, lir	iked	
lists, hash tables, recur	sion, binary trees, he	aps, sorting algorithms, gi	raphs, and	d binary t	ree.		
9. Learning Objectiv	ves:						
• To impart the b	asic concepts of data	a structures.					
• To understand	concepts about search	hing and sorting technique	es				
• To understand	basic concepts about	stacks, queues, link lists,	trees and	graphs.			
• 4. To enable the	em to write algorithn	ns for solving problems w	ith the he	elp of fund	lamental	data	
structures	-			-			
10. Course Outcomes	(COs):						
• For a given alg	orithm student will a	ble to analyze the algorith	ms to det	termine th	ne time an	d	
computation co	mplexity and justify	the correctness.					
• For a given Sea	rch problem (Linear	Search and Binary Search	n) studen	t will able	to imple	ment it.	
• For a given pro	blem of Stacks Que	ues and linked list student	will able	to imple	ment it ar	h	
analyze the san	to determine the ti	me and computation com	olevity		inent it ui	iu.	
• Student will ab	le to urite en elgorit	m Solootion Sort Dubble	Sort Ind	ortion Co	rt Ouiok	Sort	
• Student will ab			5011, 1115		II, QUICK	Son,	
Merge Sort, He	ap Sort and compare	their performance in term	1 of Spac		ie comple	xity.	
• Student will ab	le to implement Grap	oh search and traversal alg	orithms a	and deteri	nine the t	ime	
and computatio	n complexity						
11 II	4 4						
11. Unit wise detailed	Content Numbor of						
UMII-1	INUMBER OF						
An introduction to vari	ectures = 09	laturas various operation		ad with a	ach data		
structure Implementat	ion of Data Structure	s Basic concepts and not	ations m	athematic	ach uata al notatio	'n	
and functions, algorith	mic complexity and t	time space trade off. Array	vs: Types	s of arrays	Operatio	ons	
on Arrays Creation. Ins	sertion. Deletion.	space trade one rand.	,	, or arrays	, operation	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Unit – 2	Number of						
	lectures = 09						
Recursion: Introduction	n, Direct and Indirec	t Recursion, Tail Recursio	n, Efficie	ency of R	ecursion.	Link	
List: Representation of	linked list, Link list	operations, Circular Link	ed List, N	Aulti linko	ed structu	res,	
Memory Representation	n: Fixed Block Stora	age and Variable Block St	orage, Ap	oplication	s of Linke	ed List	
Stack: Memory Representation of Stacks via arrays and Linked List, Operations on Stack: Push,							
pop, Application of st	ack: Infix to postfix	and prefix forms for exp	pressions	, Evaluati	on of pos	stfix	

expressions, Tower of Hanoi Problem.Unit - 3Number of
	lectures = 9				
Queue: Representation	Queue: Representation using array and linked List, Operations on Queue, Insertion, deletion, Types of				
queues, Applications: S	Simulation etc.				
Trees: Definitions and	basic concepts, linked	tree representation, representations in contiguous			
storage, binary trees an	d its types, Minimum	Spanning Trees, B Tree, B+ Tree: definitions,			
algorithms and analysis.					
Unit – 4	Number of				
lectures = 9					

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis. Physical Implementation of Binary Tree in Graph, Applications of Graphs – Shortest Path Problem.

#### 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

# 13. Books Recommended

## Text books:

- 1. -Fundamentals of Data Structures<sup>II</sup>, Illustrated Edition by Ellis Horowitz, SartajSahni, Computer Science Press.
- 2 Seymour Lischutz, Data Structures, McGraw-Hill Book Company, Schaum's Outline Series, New York.

# **Reference books:**

- 1. Trembley, J.P. and Sorenson P.G. An Introduction to Data Structures with Applications, McGraw-Hill International Student Edition, New York.
- 2. YedidyahLangsam, Moshe J Augernstein and AarsonM.Tanenbaum, Data Structures using C and C ++, PHI, New Delhi.

## Semester – III BCA (Cloud Computing)

1. Name of the Department:- Computer Science Engineering						
2. Course Name	Data Structure	L	T P		Р	
	Lab					
3. Course Code	13450311	0	0		4	
4. Type of Course (use tick mark)		$Core(\checkmark)$	• PE()		• • • •	
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)	0	(🗸)	Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectures = 0		Tutorials = 0	Practical = 42			
8. Course Description						

The course focuses on basic and essential topics in data structures, including array-based lists, linked lists, hash tables, recursion, binary trees, heaps, sorting algorithms, graphs, and binary tree.

# 9. Learning objectives:

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, link list, trees and graphs.
- To enable them to write algorithms for solving problems with the help of fundamental data structures

# **10. Course Outcomes (COs):**

- For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
- 5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity

# **11.List of Experiments**

- **1.** Revision of programs of Data Structures from pervious semester: Sorting and Searching Techniques.
- 2. Write a Program to Implement Bubble Sort using Recursion
- 3. Write a Program to Implement Insertion Sort using Recursion
- 4. Write a Program to Implement Selection Sort using Recursion
- 5. Write a Program to Implement Linear Search using Recursion
- 6. Write a Program to Implement a Linked List
- 7. Write a Program to Implement a Doubly Linked List
- 8. Write a Program to Implement a Stack.
- 9. Write a Program to Implement a Queue dynamically
- **10.** Write a Program to Implement a Circular Linked List

- 11. Write a Program to Implement Binary Search Tree
- 12. Write a Program to Implement Inorder
- 13. Write a Program to implement Postorder
- 14. Write a Program to implement Pre order
- 15. Write a Program to implement Heapsort
- 16. Write a program to implement Breadth First search
- 17. Write a program to implement Depth First search
- 18. Write a Program to implement Dijkstra's Algorithm

# Semester – III BCA (Cloud Computing)

1. Name of the Depar	tment: Computer	Science Engineering		
2. Course Name	Computer	L	Т	Р
	Architecture			
	and			
	Organization			
3. Course Code	13450302	3	0	2
4. Type of Course (us	e tick mark)	Core $(\vee)$	<b>PE()</b>	<b>OE</b> ()
5. Pre-requisite (if		6. Frequency (use	Even Odd	Either Every
any)		tick marks)	() (*)	Sem () Sem
7. Total Number of L	ectures. Tutorials.	Practical (assuming 12	weeks of one sen	ester)
Lectures = 36	, ,	Tutorials = 0	Practical = 0	,
8. Course Description	<b>n</b> Introduction to c	organizational Basic but	ilding block diag	ram of a digital
computer system.	As the course progr	resses each major block	ranging from Proc	cessor to I/O will
be discussed in t	their full architectu	ral detail. The course	talks primarily	about Computer
Organization and A	Architecture issues,	Architecture of a typical	l Processor, Memo	ory Organization,
I/O devices and the	eir interface and Sys	tem Bus organization etc	2.	
9. Learning objective	S:			
Provide the skills need	ed for building com	puter system for various	applications in a c	areer in
Computer Science field	d.			
<b>10. Course Outcomes</b>	•			
• To understand	the basic knowledge	e of Computer system an	d its component a	nd functioning of
each componer	nts.			
• To understand	and analyze comput	er architecture and organ	nization, computer	arithmetic, and
CPU design.		_	_	
To understand	I/O system and inter	connection structures of	computer system.	
• To understand	and analyze I/O tecl	nniques and functioning	of memory.	
• To understand	various types of bus	es in a computer system	and illustrate how	data transfers is
performed.	V 1	1 2		
11. Unit wise detailed	content			
Unit-1	Number of			
	lectures = 9			
Functional Modules - I	Basic operational co	ncepts - Bus structures -	Software perform	ance – Memory
locations and addresse	s – Memory operati	ons – Instruction and ins	truction sequencin	g – Addressing
modes – Assembly lan	guage – Basic I/O o	perations-Stacks and qu	leues.	
Unit – 2	Number of			
	lectures = 9			
Addition and subtraction	on of signed number	rs – Design of fast adder	s – Multiplication	of positive
numbers - Signed operand multi-plication and fast multiplication – Integer division – Floating point				
numbers and operation	IS.			
Unit – 3	Number of			
	lectures = 9			
Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired				
control – Micro programmed control - Pipelining – Basic concepts – Data hazards – Instruction				
hazards – Influence on	hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.			
Unit – 4	Number of			
	lectures = 9			

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories -Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

## 12. Brief Description of self learning / E-learning component.

This learning method gives students to find out their learning capability. Students involve some sort of choice in this learning. As self directed learning learners can determine which modules or scenarios to review again and again.

## 13. Books Recommended

### **Text Books**

1) Computer Organization and Architecture – Designing for Performance - William Stallings, Pearson Education, 9<sup>th</sup> Edition, 2012.

### 14. Reference Books Recommended

- 1) Computer Organization Carl Hamacher, ZvonkoVranesic and SafwatZaky, 5th Edition, McGraw- Hill, 2011
- 2) Computer Organisation and Design Patterson, Elsevier Pub., 4<sup>th</sup> Edition, 2011
- **3**) Computer Organization and Design: The hardware / software interface David A.Patterson and John L.Hennessy, Morgan Kaufmann, 5<sup>th</sup> Edition, 2010
- 4) Computer Architecture and Organization John P.Hayes, Tata McGraw Hill,3<sup>rd</sup> Edition,2017.

# Semester III BCA (Cloud Computing)

1. Name of the Depar	tment- Computer	Science & Engineering		
2. Course Name	Cloud	т	Т	р
	Computing	L		I
3. Course Code	13450303	3	0	0
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>	<b>OE</b> ()
5. Pre-requisite (if		6. Frequency (use	Even () Odd	d Either Every
any)	actures Tutorials	tick marks)	( <b>v</b> )	Sem ()   Sem ()
7. Total Number of L	ectures, Tutoriais,	$\frac{\text{Practical (assuming 12)}}{\text{Tutorials} = 0}$	weeks of one	semester)
$\frac{1}{2} = \frac{1}{2} = \frac{1}$		1 utoriais = 0	Practical = 0	
<b>6.</b> Course Description	l transformed the IT i	industry by opening the r	oggibility for i	nfinite or at least
bighly electic scalabilit	w in the delivery of	anterprise applications a	nd software as	a service (SaaS)
	y in the derivery of	enterprise applications a	nu sonware as	a service (Saas).
9 Learning objective	2•			
This module gives stud	s. lents the skills and l	nowledge to understand	how Cloud Co	mnuting
Architecture can enabl	e transformation bu	isiness development and	agility in an or	reanization
	e transformation, de	isiness development and	uginty in un of	guinzation.
10. Course Outcomes	(COs):			
Describe cloud	computing concept	S		
Identify various	s cloud services			
Evaluate variou	s cloud delivery mo	odels		
<ul> <li>Assess cloud cl</li> </ul>	naracteristics and se	rvice attributes, for com	liance with en	terprise objectives
Contrast the ris	ks and benefits of i	nplementing cloud com	nuting	
11. Unit wise detailed	content	inpremienting enouge comp		
Unit-1	Number of			
· ···· -	lectures $= 09$			
<b>Cloud Computing</b>	<b>Overview</b> – Origi	ns of Cloud computir	ng. Cloud co	mponents. Essential
characteristics. On-de	mand self-service.	broad network access	. Location ir	ndependent resource
pooling. Rapid elasticit	ty, measured service	2.	,	I I I I I I I I I I I I I I I I I I I
Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT				
Model				
Virtualization - Co	ncepts, Types of	Virtualization & its l	penefits, Intro	duction to Various
Virtualization OS.				
Unit – 2	Number of			
	lectures = 09			
<b>Cloud Computing Ar</b>	chitecture: Introdu	ction - The cloud referen	ce model - Ty	pes of clouds -
Economics of the cloud	d.			
Cloud Deployment Model: Public clouds, Private clouds, Community clouds, Hybrid clouds.				
Advantages and Disadvantages, Comparison models.				
C				
Unit – 3	Number of			
	lectures = 09			
Software as a Service (SaaS): Introduction to Infrastructure as a Service delivery model.				
Characteristics, Architecture, Applicability of IaaS in the industry. SaaS service providers. Google				
App Engine, Salesforc	e.com and Google F	latform, Benefits. Opera	tional benefits.	Economic benefits.
Evaluating SaaS.	0	, - , - <b>F</b>		, <u> </u>
U				

**Platform as a Service (PaaS):** Introduction to Platform as a Service delivery model, Characteristics, patterns, Architecture. PaaS service providers: Right Scale, Salesforce.com, Services and Benefits.

Unit – 4	Number of	
	lectures = 09	

**Infrastructure as a Service (IaaS):** Introduction to Software as a Service delivery model, characteristics, Architecture, Applicability of SaaS in the industry. IaaS service providers, Amazon EC, Amazon EC2 service level agreement, Recent developments.

**Benefits:** Future directions a. Cloud Domain and scope of work, Cloud as PaaS, SaaS,Cloud Computing Programming Introduction Trends and market of cloud

### 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

#### 13. Books Recommended

#### **Text Books**

- Cloud Computing: Concepts, Technology & Architecture, Erl, Pearson Education India; 1 edition, 2014
- 4. Cloud Computing: Fundamentals By Timothy Chou's.

# **Reference Books**

- 1. The Basics of Cloud Computing: Understanding the Fundamentals of Cloud Computing in Theory and Practice 1st Edition byDerrick Rountree (Author), Ileana Castrillo (Author)
- -Cloud Computing, A Practical Approach Toby Velte, Anthony Velte, Robert Elsenpeter, McGraw-Hill Osborne Media; 1 edition [ISBN: 0071626948], 2009.

# Semester III BCA (Cloud Computing)

2. Course Name Cloud T D				
Computing Lab				
3. Course Code         13450310         0         0         2				
4. Type of Course (use tick mark)Core ( $\checkmark$ )PE()OE ()				
<b>5.</b> Pre-requisite (if <b>6.</b> Frequency (use Even () Odd Either Every	/			
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	()			
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)				
8 Course Description				
Cloud Computing has transformed the IT industry by opening the possibility for infinite or at least	st			
highly elastic scalability in the delivery of enterprise applications and software as a service	, c			
(SaaS).				
9. Learning objectives:				
This module gives students the skills and knowledge to understand how Cloud Computing				
Architecture can enable transformation, business development and agility in an organization				
10. Course Outcomes (COs):				
Describe cloud computing concepts				
Identify various cloud services				
Evaluate various cloud delivery models				
• Assess cloud characteristics and service attributes, for compliance with enterprise objectives				
Contrast the risks and benefits of implementing cloud computing				
11. List of Experiments				
Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of	Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of			
windows7 or 8.Install a C compiler in the virtual machine created using virtual box and execute				
Simple Programs.				
1. Install Google App Engine. Create hello world app and other simple web applications				
using python.				
2. Use GAE launcher to launch the web applications.				
3. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.				
4. Find a procedure to transfer the files from one virtual machine to another virtual machine				
5. Find a procedure to launch virtual machine using trystack (Online Openstack Demo				
Version)				
6. Install Hadoop single node cluster and run simple applications like word count.				
7. Install Google App Engine.				
8. To Create hello world app				
9. To create simple web applications using java.				
List of projects:				
Online Book Store using Cloud Computing				
University Campus Online Automation Using Cloud Computing				
Student Information using Cloud Computing				

# **12. Brief Description of self-learning / E-learning component**

The students will be encouraged to learn using Virtual Link.

# Semester – III BCA (Cloud Computing)

1. Name of the Depar	tment- Computer S	Science & Engineering					
2. Course Name	Algorithm	т	r	m		ъ	
	Design	L	-	L	]	ľ	
3. Course Code	13450304	3	0			0	
4. Type of Course (us	e tick mark)	<b>Core</b> (✓))	Pl	E()	<b>OE</b> ()		
5. Pre-requisite (if	Data Structure,	6. Frequency (use	Even	Odd ()	Either	Every	
any)	Programming,	tick marks)	(•)		Sem ()	Sem ()	
	Mathematics						
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)							
Lectures = 36 Tutorials = 0 Practical = 0							
8. Course Description	1						
To learn about pro	perties of algorithm	n and how to design an a	algorithm	n, discuss	asympto	tic	
notations, Design and measure time complexity analysis of searching, sorting and Graph							
traversal algorithms. Make comparison of different type of algorithm likes Linear,							
Quadratic, Polynor	nial and Exponentia	l, Describe how greedy a	approach	facilitate	solving t	he	
problem. Discuss Divide and Conquer approach for solving the problem.							
9. Learning objectiv	es						
• Analyze the asymptotic performance of algorithms.							
• Write rigorous	correctness proofs f	for algorithms.					
1							

• Demonstrate a familiarity with major algorithms and data structures.

Apply important	Apply important algorithmic design paradigms and methods of analysis.			
Synthesize efficiency	cient algorithms in c	common engineering design situations.		
10 Course Outcomes				
Argue the corre	(COS)	s using inductive proofs and invariants		
• Argue the corre				
Analyze worst-	case running times	of algorithms using asymptotic analysis.		
• Describe the di calls for it.	vide-and-conquer pa	aradigm and explain when an algorithmic design situation		
• Describe the dy situation calls f	vnamic-programmin for it.	g paradigm and explain when an algorithmic design		
• Analyze random	mized algorithms.			
11. Unit wise detailed	content			
Unit-1	Number of			
	lectures = 9			
Basics of an Algor analgorithm, Steps in Formulation (Tower Asymptotic Bounds: Comparative efficiency	<b>ithm:</b> Definition a Designing of Algo of Hanoi), Substit Asymptotic Notation y of algorithms: Lin	nd Example of an algorithm, Characteristics of orithms, Growth of function, Recurrence, Problem tution Method, Iteration Method, Master Method. ns, Concept of efficiency of analysis of analgorithm ear, Quadratic, Polynomial and Exponential.		
$\frac{1}{1}$	Number of			
	lectures = 9			
Searching and Sortin	g:Searching: Linear	Search, Binary Search, Sorting: Bubble sort,		
Insertion Sort, Selection	on sort.			
<b>Divide and Conquer</b>	Approach:General	Issues in Divide and Conquer, Merge Sort, Quick Sort.		
Unit – 3	Number of			
	lectures = 9			
Greedy Technique:El	ements of Greedy st	trategy, Activity Selection Problem, Continuous		
Knapsack Problem, Co	oin changing Problem	m, More Examples.		
Dynamic Programn	ning: Introduction	to dynamic programming and basic principle		
Examples:Longest con	Number of	and Longest increasing sub-sequence		
U m t - 4	Number of lectures – 9			
Granh Algorithm ·Ren	resentation of Gran	he Adjacency Matrix Adjacency List DepthFirst		
Search and Examples B	readth First Search	and Examples		
Backtracking. Introduc	tion principle and i	need of backtracking Example Sum of Subset N-		
Queen, and Graph cold	oring	need of buckflucking, Example.5un of Subset, 1		
12. Brief Description	of self-learning / E	-learning component		
The students will be er	couraged to learn u	sing the SGT E-Learning portal and choose the relevant		
lectures delivered by s	ubject experts of SC	T University.		
The link to the E-Learning portal.				
https://elearning.sgtuniversity.ac.in/course-category/				
13. Books Recommen	ded			
Text Books				

1. Thomas H. Cormen et.al. -Introduction to Algorithms<sup>II</sup>, Prentice Hall of India.

### **Reference Books**

1. Horowitz, Sahani, Rajsekharam, —Computer Algorithms, Galgotia Publications Pvt. Ltd.

- 2. Brassard, Bratley, -Fundamentals of Algorithms<sup>II</sup>, Prentice Hall
- 3. Richard Johnsonbaugh, -Algorithms<sup>II</sup>, Pearson Publication.

## Semester III BCA(Cloud Computing)

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Software Engineering	L	Т		I	Р	
3. Course Code	13450305	3	0				
4. Type of Course (us	e tick mark)	Core (✓)	P	E()	<b>OE</b> ()		
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every	
any)		tick marks)	0	(✔)	Sem ()	Sem ()	
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)							
Lectures = 36Tutorials = 0Practical = 0							
8. Course Description							
In this course, new software models, techniques and technologies to bring out innovative and							
novelistic solutions for the growth of the society in all aspects and evolving into their continuous							
professional development.							
Learning objectives:							
• To Know the Basics of Software Architecture.							
• To Understand various phases of Software Development Cycle.							

9. Course Outcomes (COs):

- Students will be able perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
- Students will be able to know various processes used in all the phases of the product
- Students can apply the knowledge, techniques, and skills in the development of a software product.

10. Unit wise detailed content		
Unit-1	Number of	

lectures = 09

Software: Characteristics, Components, Applications, And Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

Unit – 2	Number of	
	lectures = 09	

Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles of Structured Analysis, Requirementanalysis, DFD, Entity Relationship diagram, Data dictionary.

Unit – 3	Number of			
	lectures = 09			
Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural				

design, procedural design, Object -oriented concepts

Unit – 4	Number of
	lectures = 09

Testing fundamentals: Objectives, principles, Testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing.

# 11. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/Software engineering

# 12. Books Recommended

#### **Text Books**

**1.** Software Engineering - A Practitioner's Approach, Roger S. Pressman, MGH, NEW DELHI., NEW DELHI. Publications, New Delhi.

# **Reference Books**

1. Fundamentals of Software Engineering, Rajib Mall, PHI, New Delhi.

2. An Integrated Approach to Software Engineering by PankajJalote, Narosa Publications, New Delhi.

## Semester – IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Formal	L	T F		Р	
	Language &					
	Automata					
	Theory					
3. Course Code	13450401	3	0		0	
4. Type of Course (use tick mark)		Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(🗸)		Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 14	weeks o	f one sem	nester)	
Lectures = 36Tutorials = 0Practical = 0						
8. Course Description	1					
This course provides students a synopsis of latest trends in automotive industry used in evaluation of						
world. This includes understanding the basic principles of various hybrid and electric vehicles with						
importance, applications and limitations.						
9. Learning objectives:						
Davidon a formal notation for strings, languages and machines						

Develop a formal notation for strings, languages and machines.Design finite automata to accept a set of strings of a language.

- Prove that a given language is regular and apply the closure properties of languages.
- Design context free grammars to generate strings from a context free language and convert them into normal forms.
- Prove equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
- Identify the hierarchy of formal languages, grammars and machines.
- Distinguish between computability and non-computability and Decidability and undecidability.

# **10.** Course Outcomes (COs):

- Write a formal notation for strings, languages and machines.
- Design finite automata to accept a set of strings of a language.
- For a given language determine whether the given language is regular or not.
- Design context free grammars to generate strings of context free language .
- Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
- Write the hierarchy of formal languages, grammars and machines.
- Distinguish between computability and non-computability and Decidability and undecidability.

#### 11. Unit wise detailed content Unit-1 Number of

Number of
lectures = 09

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

Unit – 2	Number of
	lectures = 09

Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.

0 0 0 1	1 0
Unit – 3	Number of
	lectures = 09

Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.

Unit – 4	Number of
	lectures = 9

Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. Turing machines: The basic model for Turing machines (TM), Turing-recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines.

# 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

# 13. Text Books Recommended

 K.L.P Mishra, Theory Of Computer Science: Theory, Automata, And Computation, 3<sup>rd</sup> Edition, PHI,2006

# 14. Reference Books Recommended

- 1) John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia, , 3rd Edition,2016
- 2) Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.,2007
- 3) Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.,3<sup>rd</sup> Edition ,2014
- 4) John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.,4<sup>th</sup> Edition, 2010

Semester – IV BCA (Cloud Computing)

1. Name of the Department- Computer Science Engineering						
2. Course Name	Database	L	Т		P	
	Management					
	Systems					
3. Course Code	13450402	3	0		2	
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if	Workshop	6. Frequency (use	Even	Odd ()	Either	Every
any)	Technology	tick marks)	(🗸)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 36	Lectures = 36 Tutorials = 0 Practical = 0					
8. Course Description						
The course, Database Management Systems, provides an introduction to the management of						
database systems. The course emphasizes the understanding of the fundamentals of relational systems						
including data models, database architectures, and database manipulations. The course also provides						
an understanding of ne	w developments and	d trends such as Internet	database	environn	nent and o	lata
warehousing. The cour	rse uses a problem-t	based approach to learnin	ng			
9. Learning objectives:						
• To understand the different issues involved in the design and implementation of a database						
system.						
• To study the physical and logical database designs, database modeling, relational, hierarchical,						

- and network models
- To understand and use data manipulation language to query, update, and manage a database

- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS

10. Course Outcomes (COs): On completion of the course,

- For a given query write relational algebra expressions for that query and optimize the developed expressions
- For a given specification of the requirement design the databases using E-R method and normalization.
- For a given query optimize its execution using Query optimization algorithms

11. Unit wise detailed content				
Unit-1	Number of			
	lectures = 09			
T 1 1 0 1			<b>T</b> T <b>T T T T T T T T T</b>	0.1 . 1.6 .1.1 .0.1

Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems: Introduction to client/Server architecture. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.

Unit – 2	Number of	
	lectures = 09	

Network & Hierarchical Models, File Organization: Sequential File, index sequential files, direct files, Hashing, B-trees Index files, Inverted Lists, Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order, Relational calculus: Domain, Tuple, Well Formed Formula, specification, quantifiers, Introduction to Query Language, QBE

Unit – 3	Number of
	lectures = 09
T	

Integrity constrains, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF. Introduction to Distributed Data processing, Concurrency control: Transactions, Time stamping, Lock-based Protocols.

Unit – 4	Number of lectures = 09		
		-	

Database recovery.Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models

# 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E- Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

# 13. Books Recommended

Text book:

1. -Database System Concepts<sup>I</sup>, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

#### **Reference books:**

1 -Principles of Database and Knowledge – Base Systems∥, Vol 1 by J. D. Ullman, Computer Science Press.

2 -Fundamentals of Database Systems<sup>II</sup>, 5th Edition by R. Elmasri and S. Navathe, Pearson Education

3 -Foundations of Databases||, Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

## Semester – IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Database					
	Management	L	ſ	Г	Р	
	System lab					
3. Course Code	13450407	0	(	0 2		2
4. Type of Course (us	e tick mark)	Core (✓)	PE	EO	OI	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	f one sen	nester)	
Lectures = 0		Tutorials = 0	Practica	al = 28		
8. Course Description	l	•				
9. Learning objective	<b>s:</b> To describe the b	asics of SQL and constru	ict querie	s using S	QL.	
10. Course Outcomes (COs):						
Upon completie     develop a solut	on of the course, the	e students acquire the kno atements	owledge t	o build tł	ne logic a	nd
11. List of Experimen	its					
1. Creating Database						
i. Crea	ating a Database					
ii. Crea	ii. Creating a Table					
iii. Spe	cifying Relational D	Data Types				
2. Table and Record I	Handling					
i. INS	ERT statement					
ii. Usii	ng SELECT and IN	SERT together				

	iii. DELETE, UPDATE, TRUNCATE statements						
	iv. DROP, ALTER statements						
3.	Indexes						
	Create index, Drop Index and unique option						
4.	Integrity Constraints						
	Primary Key, Referential ,Domain and Check Constraints						
5.	Retrieving Data from a Database						
	i. The SELECT statement						
	ii. Using the WHERE clause						
	iii. Using Logical Operators in the WHERE clause						
6.	SQL functions						
7.	Advanced SQL functions						
8.	Using IN, BETWEEN, LIKE (pattern matching) operator						
9.	. GROUP BY and GROUP BY functions						
10.	10. Sub queries						
	Basic, multiple column, sub queries with having, correlated sub queries						
11.	11. Retrieving data from multiple columns						
	Joining table (Inner Join, Outer Join, Equi Join, Non-Equi join), Aliasing for table name						
12.	DCL statements						
12.	12. Brief Description of self-learning / E-learning component						

http://vlabs.iitb.ac.in/bootcamp/labs/dbms/exp8/exp/index.php

# Semester – IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Web Programming	L	Т		Р	
3. Course Code	13450404	3	0		0	
4. Type of Course (us	e tick mark)	Core (✓)	PI	<b>PE() OE</b> ()		ΕO
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(•)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 36Tutorials = 0Practical = 0						
8. Course Description						
Skill development in web programming including mark-up and scripting languages. Introduction to						
structure and object oriented programming design. Course includes use of XHTML and JavaScript						
programming languages.						

# 9. Learning objectives:

After going through this course a student should be able to:

- Use XHTML tags to create simple static web pages
- format a simple Web page using Cascading Style sheets
- state the concepts applicable to web programming; represent data over the Web using XML

• appreciate the use of Rich Internet Applications, and perform server side scripting using Java Server Pages (JSP).

#### **10. Course Outcomes (COs):**

- 1. To get familiar with the concept of Search Engine Basics.
- To gain knowledge of Rich Internet Application Technologies
- To Learn Web Service Essentials
- To learn different web programming languages
- To be familiarized with Web Analytics 2.0, Web 3.0 and Semantic web standards.

#### 11. Unit wise detailed content

Unit-1

Number of
lectures = 09

Web 2.0 and XHTML :What IsWeb 2.0? Introduction toWeb 2.0 terms: Search, Content Networks, Blogging, Social Networking, Social Media, Rich Internet Applications (RIAs), Web Services, Mashups, Widgets and Gadgets, Introduction to XHTML and WML, Syntactic Differences between HTML and XHTML, Standard XHTML Document Structure, An example of XHTML covering Basic Syntax, Images, Hypertext Links, Lists and Tables, Creation of an XHTML Form, Internal Linking and Meta Elements.

**Using Style Sheets :**CSS: Inline Styles, Embedded Style Sheets, Linking External Style Sheets, Style Specification Formats Selector Forms, Colour, Property Value Forms, Font Properties, List Properties, Alignment of Text, The Box Model, Background Image ,The <span> and <div> Tags.

Unit – 2	Number of
	lectures = 09

**Introduction to XML** :XML Basics, XML Document Structure, XML Namespaces, Document Type Definitions, XML Schemas, Displaying XML Documents.

Introduction to WAP and WML :WAP and WML Basics, WML formatting and links, , WML variables, Example.

Unit – 3	Number of	
	lectures = 09	

**JSP** – **Basic** :Basic JSP Lifecycle, JSP Directives and Elements, Scriptlets, Expressions, Action Elements, Standard Actions, Comments and Template Data, JSP variables, The out Object, Request, response, sessions and application objects.

**JSP Application Development :**Example applications using JSP, What is JDBC? Need for JDBC, Database Drivers, Connection using JDBC API.

Unit – 4 Number of lectures = 09		0	
lectures = 09	Unit – 4	Number of	
		lectures = 09	

**The Server Side Scripting :**Server side scripting and its need ,Two-Tier, Three-Tier, N-Tier and Enterprise Architecture, Various Languages/ Technologies for server scripting ,HTTP Methods (such as GET, POST, HEAD, and so on) , Purpose ,Technical characteristics, Method selection, Use of request and response primitives, Web container – Tomcat.

## 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

#### 13. Books Recommended

#### **Text Books**

Mastering HTML, CSS &Javascript Web Publishing by Lemay Laura **Reference Books** 

- 1. XHTML Black Book by Steven Holzner, 2000.
- 2. CGI Programming on the World Wide Web. O'Reilly Associates.
- 3. Web Technologies By Achyut S Godbole ,AtulKahate, 2003, T.M.H.
- 4. Scott Guelich, ShishirGundararam, Gunther Birzniek; CGI Programing with Perl 2/e O'Reilly.
- 5. Doug Tidwell, James Snell, PavelKulchenko; Programming Web services, O'Reilly
- 6. Intranets by James D.Cimino, 1997, Jaico Publ.
- 7. Internet and Web Technologies Raj Kamal, 2002, T.M.H .

### Semester – IV BCA (Cloud Computing)

Name of the Department- Computer Science & Engineering						
1. Course	Web	т	т	1	Р	
Name	<b>Programming Lab</b>	L	I			
2. Course Code	13450408	0	0			2
3. Type of Course	(use tick mark)	Core (✓)	PE	20	OI	E ()
4. Pre-requisite		5. Frequency (use	Even	Odd ()	Either	Every
(if any)		tick marks)	(🗸)		Sem ()	Sem ()
6. Total Number of	f Lectures, Tutorials,	, Practical (assuming 1	2 weeks o	f one sen	nester)	
Lectures = 0		Tutorials = 0	Practica	l = 28		
7. Course Descript	ion:					
Skill developme	ent in web programmir	ng including mark-up an	d scripting	g languag	es. Introdu	iction to
structure and object oriented programming design. Course includes use of XHTML and JavaScript						
programming languages.						
8. Learning objectives:						
• Design and implement dynamic websites with good aesthetic sense of designing and latest						
technical know-how's.						
• Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.						
• Get introduced in the area of Online Game programming.						

- WEBBASICS: Design web pages through coding using HTML and DHTML.
- Integrated Development Tool: Frontpage2000/Dreamweaver
- BROWSER SIDE SCRIPTING using JavaScript with a focus on
- Event Handling and Validation
- SERVER SIDE SCRIPTING:
- PHP SYNTAX, variables, loops and constructs.
- JAVA GRAPHICS

# **10. List of Experiments**

- 1. Create a Web Page using basic tags in html 5
- 2. Write a program to create all types of list in HTML
- 3. Create a table using Html 5 and CSS
- 4. Write a program using labels, radio buttons, and submit buttons
- 5. Create a simple webpage using HTML
- **6.** Use frames to Include Images and Videos.
- 7. Add a Cascading Style sheet for designing the web page.
- 8. Design a web page with validation using JavaScript.
- 9. How to make all fields of a form mandatory in java script
- 10. Create a registration form and validate it using java script
- **11.** Write a program to maintain session in PHP
- **12.** Perform data base connectivity in PHP
- **13.** Create a dynamic web page using PHP

# **11. Brief Description of self-learning / E-learning component**

https://html-iitd.vlabs.ac.in/

## Semester-IV **BCA** (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Advanced cloud	L	T P			
	computing					
3. Course Code	13450403	3	0		0	
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	f one sem	nester)	
Lectures = 36		Tutorials = 0	Practic	al = 0		
8. Course Description						
• To help the students to understand: The concept of cloud computing and describe the choices						
that are available to developers when creating cloud applications						
• Describe infrastructure as a service, platform as a service, and software as a service						
9. Learning objectives:						
Upon successful completion of the course in this discipline the student will be able creating cloud						oud
applications and deploy on cloud platform.						
10. Course Outcomes (COs):						
• At the end of the course, the student can: Earn basic knowledge of Cloud Technologies in use						
today	today					
• Strategic plan t	• Strategic plan to move applications and services to the Cloud					
Understand Clo	oud Segments and C	loud Deployment Mode	ls			

•	Importance	of security	in cloud	computing
---	------------	-------------	----------	-----------

• Static Application Development using Service models

11 Unit wise detailed content							
11. Unit wise detailed content       Unit 1         Number of							
Umt-1	lectures – 8						
	I ICATIONS Inter	duction Contrast traditional software development and					
development for the cl	oud Public v private	a cloud apps. Understanding Cloud access stems what is					
SeeS/DeeS nonvier AI	Duu. Fuolic v privau	e cloud apps. Onderstanding Cloud ecosystems – what is					
Saas/raas, popular Ar	-18, moone.						
Unit – 2	Number of						
	lectures = 8						
Designing code for the	cloud: Class and M	ethod design to make best use of the Cloud infrastructure;					
Web Browsers and the	Presentation Layer:	Understanding Web browsers attributes and differences.					
Building blocks of the	presentation layer: I	HTML, HTML5, CSS.					
Unit – 3	Number of						
	lectures = 10						
Web development t	echniques and fr	ameworks:- Building Ajax controls, introduction to					
Javascriptusing JQuery	, working with JSO	N, XM. Deployment Environments – Platform As A					
Service (PAAS), Amaz	zon and Google App	Engine.					
Unit – 4	Number of						
	lectures =10						
Developing Cloud App	olication with SDK f	for Node.JS: Explaining the origin and purpose of the					
Node.js JavaScript fra	mework, Writing a	simple web server with Node.js, Import Node.js modules					
into your script, Dep	oloying an IBM SI	DK for Node.js application on an IBM Cloud account,					
Explaining the concept	ot of anonymous ca	llback functions, Explaining the concept of asynchronous					
callback functions, Ha	ndling inbound HTT	P method calls for a server resource.					
Web Services and	Application Deplo	yment: Understanding the Watson Natural Language					
Understanding service,	Create and Deploy	Applications					
12. Brief Description	of self-learning / E	-learning component					
The students will be en	couraged to learn us	sing the SGT E-Learning portal and choose the relevant					
lectures delivered by su	ubject experts of SG	T University.					
The link to the E-Learn	ning portal.	5					
https://elearning.sgtuni	versity.ac.in/course	-category/					
https://elearning.sgtuniversity.ac.in/eourse-category/							
13. Books Recommended							
Text Books							
1. Chris Hay, Brian Pri	ince, Azure in Actio	n [ISBN: 978-1935182481]					
2. Henry Li, Introducir	ng Windows Azure [	ISBN: 978-1-4302-2469-3]					
<b>Reference Books</b>							
1. Eugenio Pace, Dom	ninic Betts, Scott De	ensmore, Ryan Dunn, Masashi Narumoto, MatiasWoloski,					
Developing Applicati	ons for the Cloud	d on the Microsoft Windows Azure Platform [ISBN:					
9780735656062]							
2. Eugene Ciurana, Developing with Google App Engine [ISBN: 978-1430218319]							

2. Eugene Clurana, Developing with Google App Engine [ISBN: 978-14302
 3. Charles Severance, Using Google App Engine [ISBN: 978-0596800697]

# Semester IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name Advanced cloud		L	Т		P	
	computing					
	Lab					
3. Course Code	13450409	0	0		2	
4. Type of Course (	use tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite		6. Frequency (use	Even	Odd ()	Either	Every
(if any)		tick marks)	(•)		Sem ()	Sem ()
7. Total Number of	Lectures, Tutorials,	Practical (assuming 12	2 weeks of	f one sem	ester)	
Lectures = 0		Tutorials = 0	Practica	al = 12		
8. Course Description						
• To help the st	tudents to understand	: The concept of cloud c	omputing	and descr	ibe the ch	oices that
are available to developers when creating cloud applications						
• Describe infrastructure as a service, platform as a service, and software as a service						
9. Learning objectives:						
Upon successful completion of the course in this discipline the student will be able creating cloud						
applications and deploy on cloud platform.						
10. Course Outcomes (COs):						
Evaluate various cloud delivery models.						
<ul> <li>Assess cloud characteristics and service attributes for compliance with enterprise</li> </ul>						
objectiv	es.				<b>p</b> -15•	
• Key security and control considerations within cloud computing environments						

• Ur	derstand Cloud Segments and Cloud Deployment Models					
11. List of Exp	11. List of Experiments					
1	1 Create your own cloud using a local server					
2	To Create a Warehouse Application on cloud.					
3	Configuring Eclipse to work with the cloud development platform					
4	Push applications from Eclipse to the cloud development platform					
5	Building a mobile application to test on a real device.					
6	Creating an IBM SDK for Node.js application					
7	Create a callback function					
8	Creating an Express server object					
9	Creating a Hello World Express application					
10	Creating Simple HTML view for your application					
11	Create and Deploy Applications in KubernetesClusteronMinikub					
12	Launching an application and deployment on cloud					
List of pro	jects:					
• E-L	earning Platform using Cloud Computing					
University Campus Online Automation Using Cloud Computing						
Cloud Based Student Information Chatbot Project						
eBuy Tracker – Bug Tracking System Project						
12 Brief Description of self-learning / E-learning component						
12. Diter Deser	iption of sen learning / D learning component					
The student	s will be encouraged to learn using Virtual Link.					
https://html	-iitd.ylabs.ac.in/List%20of%20experiments.html					

# Semester –IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Computer	L	Т		Р	
	Graphics					
3. Course Code	13450405	3	0	0		
4. Type of Course (use	e tick mark)	Core ()	<b>PE(</b> ✓)	$\mathbf{PE}(\checkmark)$ OE ()		
5. Pre-requisite (if	Knowledge of C	6. Frequency (use	Even	Odd ()	Either	Every
any)	programming	tick marks)	0		Sem	Sem ()
					(✔)	
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectures = 42	Tutorials = 0	Practica	al = 0			
8. Course Description						
Computer Graphics is a	a study of the hardw	are and software principl	es of inte	ractive ra	ster grapł	nics.
Students will use a stan	dard computer grap	hics API to reinforce con	ncepts and	study fu	ndamenta	1
computer graphics algo	orithms.					
9. Learning objectives:						
<ul> <li>To provide a comprehensive introduction to computer graphics leading to the ability to</li> </ul>						
understand contemporary terminology progress issues and trends						
understand	a comprehensive int	nology, progress, issues,	and trend	s.	lie ability	10

- To understand computer graphics techniques (2-D/3-D), focusing on 3D modelling, image synthesis, and rendering.
- Introduce geometric transformations, geometric algorithms, software systems (OpenGL), 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis, shading and mapping, ray tracing, radiosity, global illumination, photon

mapping, and anti-aliasing.

• To explore the interdisciplinary nature of computer graphics which is emphasized in the wide variety of examples and applications.

#### **10.** Course Outcomes (COs):

- To develop a facility with the relevant mathematics of computer graphics, e.g., 3D rotations using both vector algebra, geometrical transformations and projections using homogeneous co-ordinations.
- Apply principles and techniques of computer graphics, e.g., the graphics pipeline, and Bresenham algorithm for speedy line and circle generation.
- Apply computer graphics concepts in the development of computer games, information visualization, and business applications.

11. Unit wise detailed	content
Unit-1	Number of

rumber of
lectures = 06

Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Midpoint circle generating algorithm, and parallel version of these algorithms.

Unit – 2	Number of
	lectures = 06

Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms-Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against nonrectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit – 3	Number of	
	lectures = 10	

3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

<b>Unit – 4</b>	Number of
]	lectures = 12

Quadric surfaces, Spheres, Ellipsoid, Blobby objects, introductory concepts of Spline, Bspline and Bezier curves and surfaces.

Unit – 5	Number of	
	lectures = 08	

Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

#### 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

#### 13. Books Recommended

#### **Text Books**

- i) Computer Graphics C Version Donald Hearn and M Pauline Baker, Pearson Education
- ii) Computer Graphics Amrendra N Sinha and Arun D Udai, TMH Publications

#### **Reference Books**

- iii) Computer Graphics: A Programming Approach Steven Harrington, TMH Publications
- iv) Procedural Elements of Computer Graphics Rogers, McGraw Hill

## Semester IV BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Computer	L	Т		Р	
	Graphics					
	Lab					
3. Course Code	13450406	0	0		2	
4. Type of Course (use tick mark)		Core (✓)	<b>PE(</b> )		<b>OE</b> ()	
5. Pre-requisite		6. Frequency (use	Even	Odd ()	Either	Every
(if any)		tick marks)	(🗸)		Sem ()	Sem ()
7. Total Number of	Lectures, Tutorials,	Practical (assuming 12	weeks of	one sem	ester)	
Lectures = 0	Lectures = 0 Tutorials = 0 Practical = 12					
8. Course Description						
Computer Graphics is a study of the hardware and software principles of interactive raster graphics.						
Students will use a standard commuter anothing ADI to minforce concerts and study fundamental						

Computer Graphics is a study of the hardware and software principles of interactive raster graphics. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

#### 9. Learning objectives:

- To provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- To understand computer graphics techniques (2-D/3-D), focusing on 3D modelling, image synthesis, and rendering.
- Introduce geometric transformations, geometric algorithms, software systems (OpenGL), 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis, shading and

mapping, global illumination, photon mapping, and anti-aliasing.

• To explore the interdisciplinary nature of computer graphics which is emphasized in the wide variety of examples and applications.

## **10.** Course Outcomes (COs):

- To develop a facility with the relevant mathematics of computer graphics, e.g., 3D rotations using both vector algebra, geometrical transformations and projections using homogeneous co-ordinations.
- Apply principles and techniques of computer graphics, e.g., the graphics pipeline, and Bresesnham algorithm for speedy line and circle generation.
- Apply computer graphics concepts in the development of computer games, information visualization, and business applications.

# **11. List of Experiments**

- **1.** Write a program for 2D line drawing as Raster Graphics Display.
- 2. Write a program for circle drawing as Raster Graphics Display.
- **3.** Write a program for polygon filling as Raster Graphics Display
- **4.** Write a program for line clipping.
- 5. Write a program for polygon clipping.

**6.** Write a program for displaying 3D objects as 2D display using perspective transformation.

- 7. Write a program for rotation of a 3D object about arbitrary axis.
- 8. Write a program for Hidden surface removal from a 3D object.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

# 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using Virtual Link.

https://html-iitd.vlabs.ac.in/List%20of%20experiments.html

# Semester -V **BCA** (Cloud Computing)

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Advance						
	storage	L	T P		2		
	Management						
3. Course Code	13450501	3	0 2		2		
4. Type of Course (us	e tick mark)	Core ()	PE	<b>(√</b> )	OF	E ()	
5. Pre-requisite (if	Basic	6. Frequency (use	Even	Odd	Either	Every	
any)	knowledge	tick marks)	0	(✔)	Sem ()	Sem ()	
	about						
	Networking.						
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks o	f one sen	nester)		
Lectures = 36	Tutorials = 0	Practic	al = 0				
8. Course Description							
Information Storage an	nd Management (ISI	M) is the only course of	its kind to	o fill the l	knowledg	e gap in	
understanding varied	components of in	nformation storage infi	rastructur	e in cla	assic and	virtual	
environments. It prov	vides a comprehent	sive learning on storag	ge techno	ology, w	hich will	enable	
students to make more	e informed decisior	ns in an increasingly co	mplex I7	environ	ment. It	builds a	
strong understanding of underlying storage technologies and prepares students to learn advanced							
concepts, technologies and products.							
9. Learning objective	s:						
To understand the	basic components of	f Storage System Enviro	nment.				

To understand the Storage Area Network Characteristics and Components. To examine emerging technologies including IP-SAN. To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities. To understand the local and remote replication technologies **10. Course Outcomes (COs):** Understand the logical and physical components of a Storage infrastructure. • Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS. • Understand the various forms and types of Storage Virtualization. Describe the different role in providing disaster recovery and business continuity capabilities. Distinguish different remote replication technologies. • 11. Unit wise detailed content Unit-1 Number of lectures = 09An Overview of Data Storage Technology: History of Data Storage - Roles of Different Storage Devices, Arrays, Libraries and Jukeboxes; Storage I/O Basics - How Data is Accessed and Stored on Media, Access Time, Latency and Transfer Time; Input / Output (I/O) Stack; Storage Technologies. Unit -2Number of lectures = 09Data Protection, Backup and Restore: Meaning of Data Protection; A Model for Information, Data and Storage; Why Data Protection? Data Loss and Business Risks - Effect of Lost Data on Business Operations, Reasons for Data Loss; Designing Storage Systems for Backup and Recovery – Recovery Time Objective and Recovery Point Objective, Internal and External Das Backup, LAN-based, SAN and NAS Backup, Backup and Restore Software; Back Ups – Tape Backup, Disk-to-disk Backup, Disk-to-disk to Tape. Unit -3Number of lectures = 09Data Security: Basic Concepts; Defense – Perimeter Defense, Host and Application Defense; Authentication and Access Control; Encryption; Attacks - Denial of Service, Exploiting Programmer Errors; Man-in-the-middle Attacks; Viruses and Trojan Horses; Storage System Security – DAS Security, SAN Security; Security Practices for Storage. Unit – 4 Number of lectures = 09Storage Networks: Requirements for Network Storage; Network Storage Architectures - One-tomany relationships with DAS, Many-to-many relationships with Storage Networking; Functions of Storage Networking; Storing - Role of the Storage Controller, Initiators, Targets, and Command/response Protocols; SAN and NAS as Storing and Filing Applications; Requirements for Storage I/O. 12. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/Advance storage Management

# 13. Books Recommended

**Text Books** 

• Emc2 Corporation, "Information Storage and Management", Wiley, New Edition, 2020.

#### **Reference Books**

• Information Storage and Management: Storing, Managing, and Protecting Digital Information

4th Edition,Kindle Edition,2020

• Information Storage Digital Information by AlokShrivastava, G. Somasundaram, 2019

## Semester -V BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Advance						
	storage	т	т		D		
	Management	L	-	1		ł	
	lab						
3. Course Code	13450510	0		0	2	2	
4. Type of Course (us	e tick mark)	Core ()	PE	(✔)	OF	E ()	
5. Pre-requisite (if	Basic knowledge	6. Frequency (use	Even	Odd	Either	Every	
any)	about	tick marks)	0	(🗸)	Sem ()	Sem ()	
	Networking.						
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks o	f one sen	nester)		
Lectures = 0		Tutorials = 0	Practic	al = 24			
<b>Course Description</b>							
Information Storag	ge and Management	(ISM) is the only course	of its kin	d to fill t	he knowle	edge	
gap in understandi	ng varied componen	ts of information storage	e infrastru	cture in o	classic and	d	
virtual environments. It provides a comprehensive learning on storage technology, which will					vill		
enable students to make more informed decisions in an increasingly complex IT environment. It					ent. It		
builds a strong understanding of underlying storage technologies and prepares students to learn							
advanced concepts	, technologies and p	roducts.					

## 8. Learning objectives:

- To understand the basic components of Storage System Environment.
- To understand the Storage Area Network Characteristics and Components.
- To examine emerging technologies including IP-SAN.
- To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
- To understand the local and remote replication technologies

# 9. Course Outcomes (COs):

- Describe Data Centre Infrastructure, various storage technologies and disk performance.
- Study Intelligent Storage Systems, Analyze and implement RAID solutions.
- Analyze Storage Attached Networks and Network Attached Storage technologies and identify suitable solutions for practical applications.
- Analyze Content Addressed Storage and storage virtualization techniques.

# **10. List of Experiments**

- 1. How to Download and Run the Navisphere Manager Simulator
- 2. Logging into the Navisphere Manager
- 3. Navigating the Navisphere Manager User Interface
- 4. Case Study of RAID
- 5. RAID Group and Thin Pool creation
- 6. Creating LUNs
- 7. Creating Storage Groups and adding LUNs
- 8. Connecting Hosts to Storage Groups
- 9. Configuring SnapView Snapshots

# 11. Brief Description of self-learning / E-learning component

https://www.vlab.co.in/

# Semester -V BCA (Cloud Computing)

1. Name of the Depar	tment- Computer S	Science & Engineering				
2. Course Name	ІоТ					
	development	т	Т		Р	
	application of	L				
	Cloud					
3. Course Code	13450502	3	0		2	
4. Type of Course (use tick mark)		Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)	0	(🗸)	Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks o	f one sen	nester)	
Lectures = 36		Tutorials = 0	Practic	al = 2		
8. Course Description	8. Course Description					
The <b>course</b> presents a top-down view of IoT development application of Cloud, from applications and						
administration to programming and infrastructure. Its main focus is on parallel programming						
techniques for IoT development application of Cloud and large scale distributed systems which form						
the <b>cloud</b> infrastructur	e	0		•		

# 9. Learning objectives:

• Design and develop elegant and flexible cloud software solutions.

- Manage and deploy a cloud based application.
- Research and critique a topic related to Software development in the cloud.
- Analyze a real world problem and develop a cloud based software solution.

#### **10.** Course Outcomes (COs):

- IoT development application of Cloud explain the core issues of Cloud such as security, privacy, and interoperability.
- IoT choose the appropriate technologies, algorithms, and approaches for the related issues.
- IoT identify problems, and explain, analyze, and evaluate various IoT development applications and solutions.

#### 11. Unit wise detailed content

Unit-1	Number of			
	lectures = 09			
Cloud Based Applications: Introduction, Contrast traditional software development and development				
for the cloud. Public vs private cloud apps. Understanding Cloud ecosystems – what is SaaS/PaaS,				
popular APIs, mobile.				

<b>Unit</b> – 2		Number of			
		lectures = 09			
<b>D</b> · ·	1 0 1	ai 1 ai 1 i	 	0.1	-

Designing code for the Cloud: Class and Method design to make best use of the Cloud infrastructure; Web Browsers and the Presentation Layer: Understanding Web browsers attributes and differences. Building blocks of the presentation layer: HTML, HTML5, CSS, Silver light, and Flash.

Unit – 3	Number of		
	lectures = 09		

Web Development Techniques and Frameworks: Building Ajax controls, introduction to Javascript using JQuery, working with JSON, XML, REST. Application development Frameworks e.g. Ruby on Rails, .Net, Java API's or JSF; Deployment Environments – Platform As A Service (PAAS), Amazon, vmForce, Google App Engine, Azure, Heroku, AppForce

	<u> </u>
Unit – 4	Number of
	lectures $= 09$

Building an Application using the LAMP stack: Setting up a LAMP development environment. Building a simple Web app demonstrating an understanding of the presentation layer and connectivity with persistance.

# 12. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/IoT development application of Cloud

#### 13. Books Recommended

**Text Books** 

Chris Hay, Brian Prince, Azure in Action [ISBN: 978-1935182481]

Henry Li, Introducing Windows Azure [ISBN: 978-1-4302-2469-3]

# **Reference Books**

Paul J. Deitel, Harvey M. Deitel 2008, Ajax, rich Internet applications, and web development for programmers, Prentice Hall Upper Saddle River, NJ [ISBN: 978-013-158738-0]

# Semester -V BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Course Name IoT					
	development	т	т	Р		
	application of	L	1			
	Cloud Lab					
3. Course Code	13450511	0	0	2		
4. Type of Course (use tick mark)		Core (✓)	<b>PE</b> ()	<b>OE</b> ()		
5. Pre-requisite (if		6. Frequency (use	Even Odd	Either Every		
any)		tick marks)	() (🗸)	Sem () Sem ()		
7. Total Number of L	7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)					
Lectures = 0		Tutorials = 0	Practical = 24			
8. Course Description	L					
In this, new Design	n and Development	of application on Cloud	Lab technologie	s to bring out		
innovative and novelistic solutions for the growth of the society in all aspects and evolving into						
their continuous professional development.						
9. Learning objective	es:					
• Design and develop elegant and flexible cloud software solutions.						
• Manage and deploy a cloud based application.						

- Research and critique a topic related to Software development in the cloud.
- Analyze a real world problem and develop a cloud based software solution.

## **10.** Course Outcomes (COs):

- IoT development application of Cloud explain the core issues of Cloud such as security, privacy, and interoperability.
- IoT choose the appropriate technologies, algorithms, and approaches for the related issues.
- IoT identify problems, and explain, analyze, and evaluate various IoT development applications and solutions.

# **11. List of Experiments**

- 1. Study how to manage cloud computing resources.
- 2. Study about existing cloud characteristics and service models.
- 3. Performance evaluation of services over cloud.
- 4. Case Study: Google app engine and Microsoft azure.
- **5.** Setting up a LAMP development environment. Building a simple Web app demonstrating an understanding of the presentation layer and connectivity with persistence.
- **6.** Design, develop, test and deploy an application in the cloud using a development framework and deployment platform.
- 7. Analyze a real world problem and develop a cloud/LAMP based software solution.
- 8. Contrast software development in the web, cloud and others.

# 12. Brief Description of self-learning / E-learning component

https://www.vlab.co.in/

# Semester -V BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering											
2. Course Name	Course Name Cyber Security		Т		Р						
3. Course Code	13450503	3	0		0						
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()						
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every					
any)		tick marks)	0	(🗸)	Sem ()	Sem ()					
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)											
Lectures = 36		Tutorials = 0	Practical = 0								
Leetui es					8. Course Description						
8. Course Description	l		L								
8. Course Description Cyber security is the b	body of technologies	s, processes, and practice	es design	ed to prot	ect netwo	orks,					
8. Course Description Cyber security is the b computers, and data fro	body of technologies om attack, damage,	s, processes, and practice and unauthorized access.	es design . <b>Cyber s</b>	ed to prot security c	ect netwo	orks, each					
8. Course Description Cyber security is the b computers, and data fro professionals to spot ve	body of technologies om attack, damage, s ulnerabilities, fend o	s, processes, and practice and unauthorized access off attacks, and immediat	es design . <b>Cyber s</b> tely respo	ed to prot security of and to emo	ect netwo courses te ergencies	orks, each					
<ul> <li>8. Course Description</li> <li>Cyber security is the b computers, and data from professionals to spot ver</li> <li>9. Learning objective</li> </ul>	body of technologies om attack, damage, a ulnerabilities, fend o es:	s, processes, and practice and unauthorized access off attacks, and immediat	es design . <b>Cyber s</b> tely respo	ed to prot security cond to emo	ect netwo courses te ergencies	orks, each					

- Respond to, resolve, and recover from cyber incidents and attacks through timely information sharing, collaboration, and action
- Establish a legal and regulatory framework to enable a safe and vibrant cyberspace
- Foster a culture of cyber security that promotes safe and appropriate use of cyberspace
| • | Develop a | and cultivate | national | cyber | security | capabilities |
|---|-----------|---------------|----------|-------|----------|--------------|
|---|-----------|---------------|----------|-------|----------|--------------|

## **10.** Course Outcomes (COs):

- Cybersecurity help to gain core competencies.
- Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. Design, develop, test and evaluate secure software.
- Develop policies and procedures to manage enterprise security risks.

# 11. Unit wise detailed content

Unit-1	Number of
	lectures = 09

The Security Environment: Threats, vulnerabilities, and consequences, Advanced persistent threats, The state of security today. Principles of Cybersecurity: The interrelated components of the computing environment, Cybersecurity Management Concepts: Security governance, Management models, roles, and functions.

<b>Unit</b> – 2	Number of		
	lectures = 09		

Security Plans and Policies: Levels of planning Planning misalignment, The System Security Plan (SSP), Policy development and implementation. Security Standards and Controls, Certification and accreditation (C&A). Risk Management : Principles of risk, Types of risk, Risk strategies, The Risk Management Framework.

Unit – 3	Number of	
	lectures = 09	

Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement

Unit – 4	Number of
	lectures = 09

Fair Use, postings, criminal liability, First Amendments, Data Loss. Legal Aspects of Cyber Security : Ethics, Legal Developments, Cyber security in Society, Security in cyber laws.

**12. Brief Description of self-learning / E-learning component** <u>https://elearning.sgtuniversity.ac.in/course-category/</u>

## 13. Books Recommended

# **Text Books**

• Cyber security Essentials by by Charles J. Brooks, Christopher Grow, et al, 2018

# **Reference Books**

- Cyber security Attack and Defense Strategies by Yuri Diogenes, 2018
- Jonathan Rosenoer, "Cyber Law: The law of the Internet", Springer-Verlag, 1997.
- Mark F Grady, FransescoParisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006.

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Programming in Python	L	ŗ	Г	I	
3. Course Code	13450504	3		0	2	2
4. Type of Course (us	e tick mark)	Core (✓)	PI	E()	OF	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)	0	(🗸)	Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	f one sen	nester)	
Lectures = 36 Tutorials = 0 Practical = 2						
8. Course Description	l					
The course is designed	to provide an intro	duction to the Python pro	ogrammin	ig langua	ge. The fo	ocus of
the course is to provide	e students with an in	troduction to programm	ing, I/O, a	and visua	lization u	sing
the Python programming language. The goal of this course is to provide an introduction to Python.						
9. Learning objectiv	es:					
• Master the fundamentals of writing Python scripts.						
	iamentals of writing	, i yuloli seripis.				

- Learn core Python scripting elements such as variables and flow control structures.
- Discover how to work with lists and sequence data.

Write Python fi	unctions to facilitate	e code reuse.			
• Use Python to 1	read and write files.				
	(22.2.)				
10. Course Outcomes	(COs):				
• Explain what a	given program (in F	Python) does.			
<ul> <li>Identify and rep</li> </ul>	pair coding errors in	a program.			
• Understand and	l use object based so	oftware concepts			
11. Unit wise detailed	content				
Unit-1	Number of				
	lectures = 09				
Introduction to Python	, Advantages and D	isadvantages, Downloading and Installing ,Python Version,			
Running Python Script	s, Using the Interpr	reter interactively, Using Variables			
String Types : Normal,	Raw and Unicode				
String Operators and E	xpressions				
Math Operators and Ex	xpressions				
Writing to the Screen	Number of				
$\operatorname{Omt} = 2$	Number of lectures – 09				
Deen Dive in to Pytho					
Reading from the Kevh	oard				
Indenting is Significan	t				
The if and Else if state	ments				
While loops					
Using lists					
Using the for statemen	t				
Opening a text file					
Reading Text files					
Writing to a text file					
Unit – 3	Number of				
Duthon Librarias	lectures = 09				
Python Libraries	on data analysis lib	rort/			
Series and Data Frame	s	Tar y			
Grouping, aggregating	and applying				
Merging and Joining	und upprying				
Unit – 4	Number of				
	lectures = 09				
Error Handling					
Dealing with Syntax er	rors				
Exceptions					
Handling exceptions with try/except					
12. Brief Description of self-learning / E-learning component					
1	•, • ,				
https://elearning.sgtuni	versity.ac.in/course	-category/Programming in Python			
12 Rooks Decommen	dod				
13. BOOKS Recommen	aea				
Learning Puthon 7th E	dition -Writton by	Mark Lutz Python 2020			
Reference Rooks		Mark Dutz 1 ytholi,2020			
Python for Data Analy	sis. –Written by We	s McKinney			
i ymon for Data Amarysis. Written by Wes Werkinney					

Semester -V BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Programming	т			)	
	in Python Lab	L		1	1	
3. Course Code	13450512	0		0	2	2
4. Type of Course (us	e tick mark)	Core (✓)	P	E()	OF	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every
any)		tick marks)	0	(✔)	Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks o	f one sen	nester)	
Lectures = 0		Tutorials = 0	Practic	al = 24		
8. Course Description	1:					
The course is desig	ned to provide an ir	ntroduction to the Python	n program	uming lan	guage. Tł	ne focus
of the course is to p	provide students wit	h an introduction to prog	gramming	g, I/O, and	ł visualiza	ation
using the Python pr	rogramming languag	ge. The goal of this cours	se is to p	rovide an	introduct	ion
to Python.						
9. Learning objectives:						
• Master the fundamentals of writing Python scripts.						

- Learn core Python scripting elements such as variables and flow control structures.
- Discover how to work with lists and sequence data.
- Write Python functions to facilitate code reuse.
- Use Python to read and write files.

### **10. Course Outcomes (COs):**

- Explain what a given program (in Python) does.
- Identify and repair coding errors in a program.
- Understand and use object based software concepts

### **11. List of Experiments**

Note: Practical Exercises are to be performed according to theory syllabus.

**12. Brief Description of self-learning / E-learning component** 

https://www.vlab.co.in/

Semester -V BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Capstone	т	r	Г	1	<b>)</b>	
	Project (Minor)	L		L	1		
3. Course Code	13450509	0	(	0	4	1	
4. Type of Course (us	e tick mark)	Core (✓)	PI	E()	OF	E ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd	Either	Every	
any)		tick marks)	0	(🗸)	Sem ()	Sem ()	
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	f one sen	nester)		
Lectures = 0		Tutorials = 0	Practica	al = 48			
8. Course Description	1						
The purpose of the	Capstone Project is	for the students to apply	theoretic	cal knowl	ledge acqu	uired	
during the Data Science program to a project involving actual data in a realistic setting.							
9. Learning objectives:							
Capstone projects are generally designed to encourage students to think critically, solve challenging							
problems and develop skills such as oral communication public speaking research skills media							

literacy, teamwork, planning, self-sufficiency, or goal setting

### **10.** Course Outcomes (COs):

Integration. Students have integrated and/or applied what they have learned in their general education and major/minor coursework (and co-curricular activities, as appropriate).

### **11. List of Experiments**

(GUIDELINES FOR CAPSTONE PROJECT)

The aim of the Minor Project(s) is to lay a foundation for Major Project to be carried out by the student during 6th Semester of BCA Programme.

Each student should carry out Minor Project(s) using the software development tools/languages/technologies that they have learnt and/or have studied during the concerned semester. It should be compulsorily done by the student in-house under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.

The Minor Project(s) will be assessed by the concerned supervisor(s) and shall award marks out of 25 for each student as Internal Assessment.

#### 12. Brief Description of self-learning / E-learning component

https://capstones.utah.edu/capstone-learning-outcomes/

## Semester – VI BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Artificial Intelligence	L	]	Г	I	
3. Course Code	13450601	3	(	0	2	2
4. Type of Course (us	e tick mark)	Core (✓)	PI	E()	OF	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(🗸)		Sem ()	Sem ()
7. Total Number of L	ectures, Tutorials,	Practical (assuming 12	weeks of	f one sem	lester)	
Lectures = 36	Lectures = 36 Tutorials = 0 Practical = 2					
8. Course Description	1					
Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously.						
9. Learning objectiv	es:					

• AI must improve with the progression of time and technology.

- AI must evolve in a direction that the masses demand.
- AI must have a mechanism whereby it can be reliably patched/updated, once it has been installed on a user's PC.
- AI must be developed in a modular fashion, by different contributors, where modules can be removed, added, modified and interchanged where necessary.
- AI's 'consciousness' must be fully transferable from PC to PC, to home/building, to car/vehicle, to robot.

# **10.** Course Outcomes (CO):

- Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.
- Analyze the structures and algorithms of a selection of techniques related to searching, reasoning, machine learning, and language processing.

## 11 Unit wise detailed content

11. Unit wise detailed content							
Unit-1	Number of						
	lectures = 09						
Overview of A.I: Intro	duction to AI, Impor	rtance of AI, AI and its related field, AI techniques, Criteria					

for success. Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem Heuristic search techniques :Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

<b>Unit</b> – 2	Number of	
	lectures = 09	

Knowledge representation: Definition and importance of knowledge, Knowledge

representation, various approaches used in knowledge representation, Issues in knowledge representation Using Predicate Logic: Represent ting Simple Facts in logic, Representing instances and is a relationship, Computable function and predicate.

-	-
Unit – 3	Number of
	lectures = 09

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language Natural language processing.

Unit – 4	Number of		
	lectures = 09		

Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing Learning: Introduction learning, Rote learning.

12. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/Artificial Intelligence

## **13. Books Recommended**

**Text Books** 

D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 2019

**Reference Books** 

Nils J Nilsson, "Artificial Intelligence - A new Synthesis" New Edition (2020), Harcourt Asia Ltd.

E. Rich and K. Knight, "Artificial intelligence", TMH, New Edition, 2020.

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Artificial	т	Т		р	
	Intelligence Lab	L		L	I	
3. Course Code	13450606	0	(	0	2	
<b>4.</b> Type of Course (use tick mark) Core (✓)		PI	E()	OF	E ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	<b>(</b> ✓)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 0		Tutorials = 0	Practic	al = 24		
8. Course Description						
Artificial intelligence (AI) is a research field that studies how to realize the intelligent human						
behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and						
solve problems aut	onomously.					

## 9. Learning objectives:

- AI must improve with the progression of time and technology.
- AI must evolve in a direction that the masses demand.
- AI must have a mechanism whereby it can be reliably patched/updated, once it has been installed on a user's PC.
- AI must be developed in a modular fashion, by different contributors, where modules can be removed, added, modified and interchanged where necessary.
- AI's 'consciousness' must be fully transferable from PC to PC, to home/building, to car/vehicle, to robot.

## **10. Course Outcomes (CO):**

Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems. analyze the structures and algorithms of a selection of techniques related to searching, reasoning, machine learning, and language processing.

## **11. List of Experiments**

- List of programs to be developed using Prolog:
- Study of PROLOG.
- Write a program to solve 8 queens problem.
- Solve any problem using depth first search.
- Solve any problem using best first search.
- Solve 8-puzzle problem using best first search
- Solve Robot (traversal) problem using means End Analysis.
- Solve traveling salesman problem.

#### Note:At least 5 to 10 more exercises to be given by the teacher concerned. 12. Brief Description of self-learning / E-learning component

https://www.vlab.co.in/

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Capstone	Т	Т		Р	
	Project (Major)	L		L	I	
3. Course Code	13450605	0	(	0	8	
4. Type of Course (use tick mark)		Core (✓)	PI	E()	<b>OE</b> ()	
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(•)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 0		Tutorials = 0	Practica	al = 96		
8. Course Description						
The purpose of the Capstone Project is for the students to apply theoretical knowledge acquired						
during the Data Science program to a project involving actual data in a realistic setting.						
9. Learning objective	s:					

Capstone projects are generally designed to encourage students to think critically, solve challenging problems, and develop skills such as oral communication, public speaking, research skills, media literacy, teamwork, planning, self-sufficiency, or goal setting

### **10.** Course Outcomes (COs):

Integration. Students have integrated and/or applied what they have learned in their general education and major/minor coursework (and co-curricular activities, as appropriate).

## **11. List of Experiments**

(GUIDELINES FOR CAPSTONE PROJECT (Major))

The aim of the Major Capstone Project is to lay a foundation after 6th Semester of BCA Programme. Each student should carry out Major Capstone Project using the software development

tools/languages/technologies that they have learnt and/or have studied during the concerned semester. It should be compulsorily done by the student in-house under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.

The Major Capstone Project will be assessed by the concerned supervisor(s) and shall award marks out of 25 for each student as Internal Assessment.

## 12. Brief Description of self-learning / E-learning component

https://capstones.utah.edu/capstone-learning-outcomes/

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Hadoop	L	Т		Р	
3. Course Code	13450602	3	(	0	2	
4. Type of Course (us	e tick mark)	Core (✓)	<b>PE()</b>		<b>OE</b> ()	
5. Pre-requisite (if	Java	6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 36Tutorials = 0Practical = 0						
8. Course Description						
The course begins with a brief introduction to the Hadoop Distributed File System and MapReduce,						
then covers several ope	en source ecosystem	tools, such as Apache S	Spark, Ap	ache Dril	l, and Ap	ache

Flume. Finally, these tools are applied to real-world use cases. Ideal for business managers, students, developers, administrators, analysts or anyone interested in learning the fundamentals of transitioning from traditional data models to big data models.

# 9. Learning objectives:

- Provide the skills needed for building computer system for various applications in a career in
- Computer Science field.
- Explain the characteristics of Big Data
- Describe the basics of Hadoop and HDFS architecture
- List the features and processes of MapReduce
- Describe the basics of Pig

## **10.** Course Outcomes (COs):

- Understanding of Big Data problems with easy to understand examples.
- History and advent of Hadoop right from when Hadoop wasn't even named Hadoop.
- What is Hadoop Magic which makes it so unique and powerful.
- Understanding the difference between Data science and data engineering, which is one of the big confusions in selecting a carrier or understanding a job role.
- And most importantly, demystifying Hadoop vendors like Cloudera, MapR and Hortonworks by understanding about them.

#### 11. Unit wise detailed content

Unit-1	Number of			
	lectures = 09			

#### Data structures in Java:

Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters,

Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

<b>Unit</b> – 2	Number of	
	lectures = 09	

#### Working with Big Data:

Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop(Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local,Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.WritingMapReduce Programs:

Unit – 3	Number of	
	lectures = 09	

## Hadoop I/O:

The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

Unit – 4	Number of
	lectures = 09

# Hadoop Programming

Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

**12. Brief Description of self-learning / E-learning component** <u>https://elearning.sgtuniversity.ac.in/course-category/</u>HADOOP

#### 13. Books Recommended

**Text Books** Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly **Reference Books** Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly Hadoop in Action by Chuck Lam, MANNING Publ.

1. Name of the Department- Computer Science & Engineering						
2. Course Name	HADOOP LAB	L	Т		Р	
3. Course Code	13450607	0	0		2	
4. Type of Course (use tick mark)		Core (✓)	Pl	E()	<b>OE</b> ()	
5. Pre-requisite (if	Java	6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 0 Tutorials = 0 Practical = 24						
8. Course Description						
The course begins with a brief introduction to the Hadoop Distributed File System and						
MapReduce, then c	covers several open	source ecosystem tools,	such as A	pache Sp	ark, Apa	che

Drill, and Apache Flume. Finally, these tools are applied to real-world use cases. Ideal for business managers, students, developers, administrators, analysts or anyone interested in learning the fundamentals of transitioning from traditional data models to big data models.

## 9. Learning objectives:

- Provide the skills needed for building computer system for various applications in a career in
- Computer Science field.
- Explain the characteristics of Big Data
- Describe the basics of Hadoop and HDFS architecture
- List the features and processes of MapReduce
- Describe the basics of Pig

## **10.** Course Outcomes (COs):

- Understanding of Big Data problems with easy to understand examples.
- History and advent of Hadoop right from when Hadoop wasn't even named Hadoop.
- What is Hadoop Magic which makes it so unique and powerful.
- Understanding the difference between Data science and data engineering, which is one of the big confusions in selecting a carrier or understanding a job role.
- And most importantly, demystifying Hadoop vendors like Cloudera, MapR and Hortonworks by understanding about them.

## 11. List of Experiments

- 1. Introduction to Hadoop
- 2. Hadoop Distributed File System
- 3. Hadoop Architecture
- 4. MapReduce& HDFS Hadoop Eco Systems
- 5. Introduction to Pig
- 6. Introduction to Hive
- 7. Introduction to HBase
- 8. Other eco system Map Hadoop Developer
- 9. Moving the Data into Hadoop
- 10. Moving The Data out from Hadoop
- 11. Reading and Writing the files in HDFS using java program
- 12. The Hadoop Java API for MapReduce o Mapper Class o Reducer Class o Driver Class
- 13. Writing Basic MapReduce Program In java
- 14. Understanding the MapReduce Internal Components
- 15. HbaseMapReduce Program

# **12. Brief Description of self-learning / E-learning component**

https://www.vlab.co.in/

1. Name of the Department- Computer Science & Engineering						
2. Course Name	Enterprise Mobile Application Development	L	Т		Р	
3. Course Code	13450603	3	0		2	
4. Type of Course (us	e tick mark)	Core (✓)	PI	E()	OI	E ()
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every
any)		tick marks)	(✔)		Sem ()	Sem ()
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						
Lectures = 36		Tutorials = 0 Practical = 2				

### 8. Course Description

Enterprise mobile app development requires attention as well as mobile devices. Mobile Enterprise Application Platform tends to simplify the development process of enterprise software for employees who use various mobile devices. The main peculiarity of the MEAP platform is a cross-platform feature.

## 9. Learning objectives:

- A mobile application provides a platform to companies by which they can get engaged with their customers in real-time.
- By developing a mobile app, you can give your customers simpler and more efficient platform to use your products or services..
- You can increase your business by promoting it by offering coupons
- Through a mobile app, a customer can order any of your product or service

## **10.** Course Outcomes (COs):

- Ability to apply general programming knowledge in the field of developing mobile applications.
- Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.

#### 11. Unit wise detailed content

Unit-1	Number of
	lectures = 09

Mobile Device :Mobile Phone Evolution, Mobile Handset Characteristics, Bluetooth, Display, Keypad, Camera, Mobile Handset Categories, Handset Components, Handset Design, Handset hardware architecture, Elements inside a Mobile Handset, Hardware Architecture Evolution, Hardware architectural trends, CPU and Memory, Internal storage, Handset Power Oberoi

Unit – 2	Number of
	lectures = 09

Mobile Application Development - Mobile Application Development Paradigm, Mobile Programming Tools, Mobile Application Evolution, Thin Client, Fat Client, Future of Mobile App Development, Mobile Client Server App Architecture, Mobile App Programming in different languages, Mobile Programming best practices, Pros and Cons of Mobile Web App, SIM based Mobile App Development, SIM as a Platform, SIM as Service Differentiator.

Unit – 3	Number of
	lectures = 09

Web Application - World Wide Web, Web Application, Web Application Architecture, Web Server, Web Server Features, Web Application Server, Mobile Internet Access, Mobile Web browser Evolution, Mobile Web Development Approaches, Dynamic Content.

Unit – 4	Number of	
	lectures = 09	

Mobile Operating System --Introduction to Mobile Operating Systems and why they are needed, Open Platforms, Mobile OS Features, Symbian, BlackBerry, Android, iOS, Windows, Tizen, Ubuntu, etc.

## 12. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/Enterprise Mobile Application Development

## 13. Books Recommended

## **Text Books**

1. Wireless and Mobile Network Architectures by Yi-Bang Lin and ImrichChlamtac, Wiley-India, 2020.

2. Mobile Networks Architecture by Andre Perez, Wiley, March 2020.

# **Reference Books**

1. Mobile Computing – Technology, Application & Service Creation by Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, Tata McGraw-Hill, 2019

2. GSM - Architecture, Protocols and Services by JörgEberspächer, Hans-JoergVögel, Christian Bettstetter, Christian Hartmann John Wiley & Sons, Dec-2018

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Enterprise						
	Mobile						
	Application	L	]	Г	I	<b>D</b>	
	Development						
	Lab						
3. Course Code	13450608	0		0		2	
4. Type of Course (use tick mark)		Core (✓)	<b>PE()</b>		<b>OE</b> ()		
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every	
any)		tick marks)	(🗸)		Sem ()	Sem ()	
7. Total Number of L	7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						

Lectures = 0	Tutorials = 0	Practical = 24
8. Course Description		
Enterprise mobile app development re	equires attention as well a	s mobile devices. Mobile
Enterprise Application Platform tends	to simplify the developm	nent process of enterprise software
for employees who use various mobile	e devices. The main pecu	liarity of the MEAP platform is a
cross-platform feature.		
9. Learning objectives:		
• A mobile application provides a p	latform to companies by	which they can get engaged with
their customers in real-time.		
• By developing a mobile app, you	can give your customers	simpler and more efficient platform
to use your products or services		
• You can increase your business by	promoting it by offering	coupons
• Through a mobile app, a customer	can order any of your pr	oduct or service
10 Course Outcomes (COs):		
Ability to apply gaparel program	ing knowledge in the fie	ld of doveloping mobile
• Ability to apply general programm applications.	ning knowledge in the ne	a of developing moone
• Understanding of the specific requark a mobile context.	irements, possibilities an	d challenges when developing for
11. List of Experiments		
Note: Practical exercises will be done as p	per theory syllabus.	
12. Brief Description of self-learning / I	E-learning component	
https://www.vlab.co.in/		

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Design and Development of application on Cloud	L	]	Г	]	2	
3. Course Code	13450604	3	(	)		2	
4. Type of Course (use tick mark)		Core (✓)	<b>PE()</b>		<b>OE</b> ()		
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every	
any)		tick marks)	<b>(</b> ✓)		Sem ()	Sem ()	
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)							
Lectures = 36		Tutorials = 0	Practic	al = 2			

### 8. Course Description

In this course, new Design and Development of application on Cloud and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

#### 9. Learning objectives:

Design and develop elegant and flexible cloud software solutions.

Manage and deploy a cloud based application.

Research and critique a topic related to Software development in the cloud.

Analyze a real world problem and develop a cloud based software solution.

#### **10.** Course Outcomes (COs):

Explain the core issues of Design and Development of application on Cloud computing such as security, privacy, and interoperability.

Choose the appropriate technologies, algorithms, and approaches for the related issues.

Identify problems, and explain, analyze, and evaluate various Design and Development of application on Cloud computing solutions.

#### 11. Unit wise detailed content

Unit-1 Number of lectures = 09

DESIGNING CLOUD BASED APPLICATIONS: Role of business analyst, requirements gathering, UML, use of state diagrams, wire frame prototypes, use of design tools such as Balsamic. Selecting front end technologies and standards, Impact of growth in mobile computing on functional design and technology decisions.

Unit – 2	Number of
	lectures = 09

CLOUD APPLICATION DEVELOPMENT: Technical architecture considerations – concurrency, speed and unpredictable loads. Agile development, team composition (including roles/responsibilities), working with changing requirements and aggressive schedules. Understanding Model View Controller (MVC). Advanced understanding of –viewsl, location, and the presentation layer: Advanced Ajax and JQuery.

Unit – 3

Number of lectures = 09

STORING OBJECTS IN THE CLOUD: Session management. Advanced database techniques using MySQL and SQL Server, blob storage, table storage. Working with Third Party APIs: Overview of interconnectivity in cloud ecosystems. Working with Twitter API, Flickr API, Google Maps API. Advanced use of JSON and REST.

Unit – 4	Number of
	lectures = 09

CLOUD APPLICATIONS AND SECURITY ISSUES: Understanding cloud based security issues and threats (SQL query injections, common hacking efforts), SSL, encrypted query strings, using encryption in the database. Authentication and identity. Use of oAuth. OpenID; Understanding QA and Support: Common support issues with cloud apps: user names and passwords, automated emails and spam, browser variants and configurations. Role of developers in QA cycle. QA techniques and technologies. Use of support forums, trouble ticketing.

12. Brief Description of self-learning / E-learning component

https://elearning.sgtuniversity.ac.in/course-category/Design and Development of application on Cloud

# 13. Books Recommended

Text Books

Chris Hay, Brian Prince, Azure in Action [ISBN: 978-1935182481]

**Reference Books** 

Henry Li, Introducing Windows Azure [ISBN: 978-1-4302-2469-3]

Paul J. Deitel, Harvey M. Deitel 2008, Ajax, rich Internet applications, and web development for programmers, Prentice Hall Upper Saddle River, NJ [ISBN: 978-013-158738-0]

Eugenio Pace, Dominic Betts, Scott Densmore, Ryan Dunn, Masashi Narumoto, MatiasWoloski, Developing Applications for the Cloud on the Microsoft Windows Azure Platform [ISBN: 9780735656062]

Semester – VI BCA (Cloud Computing)

1. Name of the Department- Computer Science & Engineering							
2. Course Name	Design and Development of application on Cloud Lab	L	]	Г	]		
3. Course Code	13450609	0		0		2	
4. Type of Course (use tick mark)		<b>Core</b> (✓))	<b>PE(</b> )		<b>OE</b> ()		
5. Pre-requisite (if		6. Frequency (use	Even	Odd ()	Either	Every	
any)		tick marks)	(•)		Sem ()	Sem ()	
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)							

Lectures = 0	Tutorials = 0	Practical = 24
8. Course Description	•	
In this course, new Design an	d Development of applicatio	n on Cloud and technologies to bring
out innovative and novelistic	solutions for the growth of the	he society in all aspects and evolving
into their continuous profession	onal development.	
9. Learning objectives:		
Design and develop elegant and f	lexible cloud software solution	ons.
Manage and deploy a cloud based	l application.	
Research and critique a topic rela	ted to Software development	t in the cloud.
Analyze a real world problem and	d develop a cloud based softw	ware solution.
<b>10. Course Outcomes (COs):</b>		
Explain the core issues of Design	and Development of applica	tion on Cloud computing such as
security, privacy, and interoperab	oility.	
Choose the appropriate technolog	gies, algorithms, and approac	hes for the related issues.
Identify problems, and explain, a	nalyze, and evaluate various	Design and Development of applicatio
on Cloud computing solutions.		
11. List of Experiments		
Study how to manage cloud com	puting resources.	
Study about existing cloud charac	cteristics and service models.	
Case Study Casels and anging a	es over cloud.	
Case Study: Google app engine a	anvironment Duilding a sim	unle Web ann demonstrating an
understanding of the presentation	layer and connectivity with	norsistence
Design develop test and deploy	an application in the cloud w	sing a development framework and
deployment platform	an application in the cloud u	sing a development framework and
Analyze a real world problem and	d develop a cloud/L AMP has	red software solution
Contrast software development in	the web cloud and others	software solution.
12 Brief Description of self-leas	rning / F-learning compone	ant
12. Diter Description of sen-lea	thing / E-learning compone	
https://www.ylab.co.in/		

<b>Open elective –I</b>	
BCA (Cloud Computing)	

1. Name of the Department- Centre for Languages and Communication							
2. Course	<b>Professional Communication</b>	L	Т		Р		
Name	Skills						
3. Course	13450307	3	0		0		
Code							
4. Type of Course (use tick mark)		Core ()	<b>PE() OE</b> (✓)		)		
5. Pre-	Proficiency in English	6. Frequency	Even	Odd	Either	Every	
requisite		(use tick	0	0	Sem	Sem	
(if any)		marks)			0	0	
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)							

Lectures = 36		Tutorials = 0	Practicals = 0			
8. Course Descr	ription					
<b>Professional communication courses</b> are designed to provide business <b>professionals</b> with the tools						
that they need to	communicate clearly and effecti	vely. They often cov	ver subjects such			
as communicati	ion theory, writing, speaking, inter	rcultural <b>communic</b>	ation,			
correspondence,	communications history, and lea	dership <b>skills</b> .				
9. Learning of	9. Learning objectives:					
• Enhancir	• Enhancing listening-speaking Skills					
Enhance	ment of Vocabulary and Pronuncia	ation Skills.				
• Enhance	ment of Debating Skills which wil	I further enhance pu	blic speaking Skills			
Induce R	eading and Thinking ability	F -				
Fnhancir	ag skills pertaining to industry					
10 Course Out	comes (COs).					
IV. Course Out	comes (COS).	studente will.				
• Opon suc	cessiul completion of this course	students will:				
• Abla to a	onvou thair ideas in an avprassive	and affactive way				
• Able to c	produces in an expressive					
• Able to s	peak confidently before the audien	nce				
• Able to g	get a nonstic industry perspectives					
11. Unit wise de	etailed content	1				
Unit-1	Number of lectures = 9					
Listening and S	peaking Comprehension: Greeti	ings and self introdu	ction, Review of Animated mute			
short stories, Au	dio clippings followed one respon	se questionnaire				
<b>Unit</b> – 2	Number of lectures = 9					
Unit-2: Vocabu	lary Building and Pronunciation	<b>n:</b> Introduction to ap	pp based dictionary-Merriam			
Webster and Vo	cab24					
Understanding o	of Syllable, Stress, Pitch, and Inton	ation, Word buildin	g with compounding process			
Unit – 3	Number of lectures =9					
Unit-3: Speakir	ng Comprehension: Introduction	to language used in	social networking- code mixing			
and code switc	hing, Panel Discussion with tug	g of words, Fish b	owl technique, Situation based			
dialogues. Spon	taneous throw of ideas leading to	o problem solving,	situation based dialogues, case			
studies.						
Unit – 4	Number of lectures = 9					
Unit-4: Reading	g Comprehension: Introduction to	b essence of reading	. Types of Reading, Extensive			
reading session	of newspaper, excerpt, articles, sto	ories, critical analysi	s on reading abstracts. Making			
a digital newspa	per with innovative categories.					
Writing Com	prehension: Paragraphs, Essay	vs, Short stories,	Articles, Reports, Proposal,			
Dissertation, Th	esis, Letters, Emails, Note taking,	Note making				
12. Brief Descri	ption of self learning / E-learnin	ig component				
Students can pra	actice from various sites online for	Aptitude Building (	Questions.			
https://www.ind	iabix.com/. https://www.indiabix.c	com/online-test/apti	tude-test .			
https://www.cra	zvengineers.com > > Engineering	g Jobs & Career Ad	vice.			
https://testbook.com/aptitude.etc						
The students will be encouraged to learn using the SGT EL earning portal and choose the relevant						
lectures delivered by subject experts of SGT University						
The link to the E-Learning portal:						
https://elearning.sgtuniversity.ac.in/course-category/general/						
13 Books Recommended (3 Text Books + 2-3 Reference Books)						
1. Improve	your Writing, V.N. Arora, Laksh	mi Chandra, Oxford	d University Press, New Delhi			
2014						
2. Technical	l Communication Principles and	Practice', Meenak	shi Raman and Sangeeta			

Sharma, Oxford University Press 2012

- **3. Communication Skills in English,** D. G. Saxena and KuntalTamang, Top Quark, 2011 cue
- 4. \_Essential English Grammar', Raymond Murphy, Cambridge University Press 1998

## Open elective –I BCA (Cloud Computing)

1. Name of the Department- Mechanical Engineering						
2. Course Name	Industrial	L	Т		Р	
	Safety					
	Engineering					
3. Course Code	13450308	3	0		0	
4. Type of Course (us	e tick mark)	Core ()	<b>PE()</b>		<b>OE</b> (✓)	
5. Pre-requisite (if	Workshop	6. Frequency (use	Even	Odd ()	Either	Every
any)	Technology	tick marks)	0		Sem	Sem ()
					(🗸)	
7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)						

Lectures = 36		Tutorials = 0Practical = 0			
8. Course Description					
This course provides st	tudents a brief overv	view on Industrial Safety. This includes understanding the			
safety precautions in va	arious manufacturin	ng processes. Also give overview on safety in finishing and			
testing.	testing.				
9. Learning objectiv	es:				
<ul> <li>Possess a master</li> </ul>	ery of Health safety	and environment knowledge and safety management skills,			
to reach higher	levels in their profe	ession.			
• Effectively co	mmunicate inform	nation on Health safety and environment facilitating			
collaboration v	with experts across	s various disciplines so as to create and execute safe			
methodology ir	n complex engineeri	ing activities.			
<ul> <li>Competent safe</li> </ul>	ety Engineer rende	ering professional expertise to the industrial and societal			
needs at nation	al and global level s	subject to legal requirements.			
10. Course Outcomes	(COs): On complet	tion of the course,			
<ul> <li>Apply knowled</li> </ul>	ge of Mathematics,	Science, Engineering fundamentals and an engineering			
specialization f	or hazard identificat	tion, risk assessment and control of occupational hazards. b.			
<ul> <li>Design, Establi</li> </ul>	sh, Implement main	tain and continually improve an occupation health and			
management sy	stem to improve sat	fety.			
Conduct invest	igations on unwante	ed incidents using root cause analysis and generate			
corrective and	preventive action to	prevent recurrence and occurrence of such incidents.			
Design complex	x man machine syst	tems using human factors engineering tools so as to achieve			
comfort, worke	r satisfaction, efficie	ency, error free and safe workplace environment.			
Function effect	ively as an individu	al and as a member or leader in diverse teams and in multi-			
disciplinary set	tings so as to provid	le practical solutions to safety problems			
11. Unit wise detailed	content	ie practical solutions to safety problems.			
Unit-1 Number of Title of the unit: Safety in metal working and wood					
	lectures $= 08$	working machines			
General safety rules-tu	rning machines-bor	ing machines-milling, planning and grinding			
machines-general safet	ty principles-safety	in the use of sawing machines-wood working equipment's.			
CNC machines-need	for selection and c	are of cutting tools – preventive maintenance, periodical			
checks for safe operation	on – associated haza	ards and prevention.			
Unit – 2	Number of	Title of the unit: Principles of Machine Guarding			
	lectures $= 09$				
Guarding during maint	enance-Zero Mecha	anical State (ZMS) – Definition – Policy			
for ZMS – guarding of	hazards point of op	peration, protective devices-machine guarding- types-fixed			
guard-interlock guard-	automatic guard-trip	p guard-electron eye-positional control guard-fixed guard			
fencing. Selection and	suitability: lathe-dri	illing-boring-milling-grinding- shaping-sawing-shearing-			
presses-forge hammer-	flywheels-shafts-co	ouplings-gears			
sprockets wheels and	d chains- pulleys	and belts-authorized entry to hazardous			
installations-benefit	s of good guarding	g systems.			
Unit – 3	Number of lectures $= 09$	Title of the unit:Safety in Welding and Gas Cutting			
Gas welding and ox	ygen cutting-resi	istances welding, arc welding and cutting-common			
hazards-personal prot	tective equipment-	-training-safety precautions in brazing, soldering and			
metalizing – explo	sive welding – s	selection, care and maintenance of the associated			
equipment and instruments - safety in generation, distribution and handling of industrial gases-					
colour coding – flas	hback arrestor –	leak detection-pipe line safety-storage and handling			
of gas cylinders.					
<b>Unit</b> – <b>4</b>	Number of	Title of the unit:			
	lectures = 9	Safety in Cold Farming and Hot Working of Metals			

Cold working-power presses-point of operation safe guarding-auxiliary mechanisms feeding and cutting mechanism-hand or foot-operated presses-power press electriccontrols-power press set up and die removal-inspection and maintenance-metal sheers- press brakes. Hot working safety in forging-hot rolling mill operation – safe guards in hot rolling mills – hot bending of pipes – hazards and control measures. Safety in gas furnace operation – cupola-crucibles-ovens-foundry health hazards-work environment-material handling in foundries-foundry production cleaning and finishing foundry processes.

## 12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E- Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

## 13. Books Recommended

i) -Occupational safety Manual BHEL, Trichy, 1988.

ii) -Accident Prevention Manual∥ – NSC, Chicago, 1982.2

iii) -Safety Management by John V.Grimaldi and Rollin H.Simonds, All India Travellers Book seller, New Delhi, 1989.

iv) -Safety in Industry N.V.KrishnanJaicoPublishery House, 1996

v) Indian Boiler acts and Regulations, Government of India

vi) Safety in the use of wood working machines, HMSO, UK 1992.

vii) Health and Safety in welding and Allied processes, welding Institute, UK, High Tech. Publishing Ltd., London, 1989.

# Open elective –I BCA (Cloud Computing)

1. Name of the	Department- Centre for languag	ges and Communic	ation				
2. Course	FL- German language-I	L	Т		Р		
Name							
3. Course	13450306	3	0		0		
Code							
4. Type of Cou	rse (use tick mark)	Core ()	<b>PE()</b>	Γ	<b>OE</b> (✓)	)	
5. Pre-		6. Frequency	Even	Odd)	Either	Every	
requisite		(use tick	((✔)		Sem	Sem	
(if any)	(if any)   () ()						
7. Total Number	er of Lectures, Tutorials, Practic	cal (assuming 12 we	eks of o	ne sem	ester)		
Lectures $= 36$		Tutorials = 0	Practi	cal = 0			
8. Course Desci	ription						
Basic communic	cation in simple German, Simple c	conversational phras	es, form	ation of	simple	••	
sentences, negat	ive sentences, interrogative senter	nces, simple vocabul	ary relat	ted to he	ouse, fam	ily,	
common objects	s, simple prepositions and conjuga	tion of verbs.					
1. Learning of	jectives:						
The students will							
• Familiar	with the basic level of German La	anguage					
• Able to u	inderstand communication in Ger	man language					
• Can read	simple sentences of day to day L	ife					
9. Course Outc	omes (COs):						
Upon successful	completion of this course student	ts will:					
Understa	inding of the pronunciation of Ger	man words.					
Introduce	e them.						
Able to y	write effectively						
10. Unit wise d	etailed content						
Unit-1	Number of lectures = 08	Title of the unit: (	Getting	to know	people		
Getting to know	v people		8		P - P		
Alphabet	L. P.						
Vocabulary							
Introduction							
Unit – 2	Number of lectures = 08	Title of the unit: A	Arrival				
Arrival							
Pronouns and V	erbs						
Question format	ion						
Unit – 3	Number of lectures = 08	Title of the unit: S	Seeing t	he Sight	S		
Seeing the Sigh	ts						
Finding your way on foot							
How do I get to							
How to point out something							
Verbs Again (G	rammar )						
Unit – 4	Number of lectures = 10	Title of the unit: l	Public T	'ranspoi	rtation		
Public Transpo	rtation						
What to say to the	he conductor						

Some contractions More action Verbs On Nouns and Articles (grammar) All about Time and Numbers What time is it ? **Ordinal Numbers** Our Travel plans Grammar **Countries and Languages** I am ..... I am travelling to... Lost in the way. **11. Brief Description of self-learning / E-learning component** Learngermanwtihjenny.com ➢ Learngermanwithanja.com Smartergerman.com ▶ Lingoda.com The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/general **12. Books Recommended** Text book Barron's German (Learn Deutsch) The Fast and Fun Way. Third Edition by Paul and Heywood Wald, coordinating Editor. 2004 **Reference Books** Deutsch alsFremdSprache A1 by Dengler, Rusch, Schmitz and Sieber. Klett Langenscheidt, Munchen. Published by Goyal Publishers Lernziel Deutsch: Deutsch alsFremdsprache by Wolfgang Hieber. 2007. Max HueberVerlag (Max Hueber Publication) Munchen

German Elementary Grammar by Kars

# Open elective –I BCA (Cloud Computing)

1. Name of the	e Department	ent CIVIL ENGINEERING				
2. Course	Urban	L	Т		Р	
Name	Water					
	Resources					
	Management					
3. Course	13450309	3	0		0	
Code			Ũ		0	
4 Type of Cou	rse	Core ()	PEO		$OE(\checkmark)$	
4. Type of Cou			1 L()			
5. Pre-		6. Frequency (use tick	Even ()	Odd ()	Either	Everv
requisite		marks)			Sem ()	Sem ()
(if any)					~ ()	~ ()
7. Total Numbe	er of Lectures, 7	<b>Tutorials, Practical</b>				1
Lectures = 36	,	Tutorials =00	Practical	= 0		
8. Brief Syllabu	IS		1			
Student will study t	he ways in whicl	n water availability and use are	matched. a	and seek to	develop a	lternative
land use and wate	r allocation pol	licies including legal and in	stitutional	arrangeme	ents from	the local
watershed to the has	sin scale and bev	ond	stitutional	unnungenne	into nom	the local
9 Learning ohi	iectives:					
1 To introduce the	concents of urba	nization and its impact on the r	atural wate	r cycle		
2 The student is exi	nosed to the use	the urban storm water models f	for better st	orm water	manageme	ont
3 Students also exp	posed to the use	paration of urban storm water i	master nlan	and differ	ent types o	f
operation and maint	anance	paration of urban storm water	master plan		ent types o	1
	enance.					
At the completion of	f the course the	student should be able to				
At the completion o	i the course the s	student should be able to	na and main	toinin a th	a different	
1. Apply appropriate	e management te	configues for planning, operating	ng and main	itaning th	e different	
		ystem.				
10. Unit wise d	etalled content					
Unit-1	Number of	Title of the unit:				
<b>XX</b> 7 , 1 1	lectures = 8	Urban Hydrologic Cycle	11 1		1 • 1	1
Water in the urban e	eco-system – Urt	ban Water Resources – Major p	problems –	Urban hyd	rological c	ycle –
Storm water manage	ement objectives	and limitations – Storm water	policies – f	reasibility	considerat	10n
Unit $-2$	Number of	Title of the unit:				
<b>—</b> ( 11 <b>—</b>	lectures = 08	Urban Water Resources Ma	inagement	Models		
Types of models – I	Physically based	- conceptual or unit hydrograp	h based $-$ U	Jrban surfa	ace runoff	models –
Management model	s for flow rate ar	nd volume control rate – Qualit	y models.			
Unit – 3	Number of	Title of the unit:				
	lectures = 8 Urban Storm Water Management					
Storm water manage	ement practices (	Structural and Non-structural	Manageme	nt measure	es) – Deten	tion and
retention concepts – Modelling concept – Types of storage – Magnitude of storage – Hydraulic analysis and						
design guidelines – Flow and storage capacity of urban components – Temple tanks.						
Unit – 4	Number of	Title of the unit:				
	lectures = 08	Master Plans				
Planning and organi	zational aspects	- Inter dependency of planning	g and imple	mentation	of goals ar	nd
measures – Socio –	economics finan	cial aspects – Potential costs a	nd benefit n	neasures –	Measures	of urban
drainage and flood of	drainage and flood control benefits – Effective urban water user organizations.					

# 1. Books Recommended (3 Text Books + 2-3 Reference Books)\_

## **Text Books**

1. Geiger, W.F., Marsalek, F., and Zuidena, F.C., (Ed), manual ondrainage in urbanized areas – Vol.1 and Vol.II, UNESCO,

2. Hengeveld, H. and C. De Voch.t (Ed)., Role of Water in Urban Ecology

3. Martin, P. Wanelista and Yousef, A. Yousef., Storm Water Management, John Wiley and son **Reference Books** 

1.Neil S. Grigg., Urban Water Infrastructure Planning, Management and Operations, John Wiley and Sons

1. Name of the l	Department- Centre for languag	ges and Communica	ation			
2. Course	FL- German language-II	L	Т		Р	
Name						
3. Course	13450505	3	0		0	
Code						
4. Type of Cour	se (use tick mark)	Core ()	<b>PE()</b>		<b>OE</b> (✓)	)
5. Pre-		6. Frequency	Even	Odd	Either	Every
requisite		(use tick	0	(🗸)	Sem	Sem
(if any)		marks)			0	0
7. Total Numbe	7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)					
Lectures = 36		Tutorials = 0	Practi	cal = 0		
8. Course Descr	iption					
Can understand s	sentences and commonly used exp	pressions associated	with top	oics dire	ctly relate	ed to
his/her direct cire	cumstances (e.g., personal inform	ation or information	about h	is/her fa	mily, sho	opping,
work, immediate	surrounding). Can make him/ her	rself understood in s	imple, r	outine s	ituations	
dealing with a si	mple and direct exchange of infor	mation on familiar a	nd com	mon top	ics. Can	
describe his/her	background and education, immed	liate surroundings a	nd other	things a	associated	d with
immediate needs	in a simple way					
2. Learning ob	jectives:					
The students wil	l be:					
1. Enabled to	o write/frame simple sentences in	day to day Life.				
2.Able to un	derstand communication in Germ	an language				
3.Able to sp	eak simple sentences of day to day	y Life				
9. Course Outco	omes (COs):					
Upon successful	completion of this course student	s will:				
i) Understa	nd simple German conversation.					
ii) Write Ger	man language easily.					
iii) Able to s	peak simple sentences.					
10. Unit wise de	tailed content					
Unit-1	Number of lectures = 09	Title of the unit: (	Cars and	d Vans		
Cars and Vans						
Road signs						
At the Car Renta	ll Office					
Essential phrases	s for Drivers					
Road signs						
At the service sta	ation					
The Car						
Essential Expressions about your car						
Grammar :						
The Imperative						
Modal Verbs						
Unit – 2	Number of lectures = 09	Title of the unit: A	At the G	rocery	store	
At the Grocery	store					
How do you say						
Grammar :						
More important	Verbs					

weather / Season
How is the weather
If today is Tues day, then
Grammar
Adjective
Unit - 4Number of lectures = 9Title of the unit: Airplanes and Trains
Airplanes and Trains
The Plane
Asking for something
All Aboard
Grammar :
Reflexive Pronouns
Direct Object Pronouns
Ordering Food
Meals / Food
Breakfast
The Table
The main Meal, The Noon meal
To give and take
11. Brief Description of self-learning / E-learning component
Learngermanwtihjenny.com
Learngermanwithanja.com
Smartergerman.com
Lingoda.com
The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant
lectures delivered by subject experts of SGT University.
The link to the E-Learning portal.
https://elearning.sgtuniversity.ac.in/course-category/general
12. Books Recommended
Text book
Barron's German (Learn Deutsch) The Fast and Fun Way. Third Edition by Paul and Heywood
Wald, coordinating Editor. 2004
Reference Books
Deutsch alsFremdSprache A1 by Dengler, Rusch, Schmitz and Sieber. Klett Langenscheidt,
Munchen. Published by Goyal Publishers
Lernziel Deutsch: Deutsch alsFremdsprache by Wolfgang Hieber. 2007. Max HueberVerlag
(Max Hueber Publication) Munchen
German Elementary Grammar by Kars

1.	Name of the l	Department: Centre for Langua	ges & Communica	tion			
2.	Course	Personality & Career	L	Т		Р	
	Name	Building					
3.	Course	13450506	3	0		0	
	Code						
4.	<b>Type of Cour</b>	rse (use tick mark)	Core ()	<b>PE()</b>		<b>OE</b> (√)	
5.	Pre-	English Language Proficiency,	6. Frequency	Even	Odd	Either	Every
	requisite	Aptitude Building Basics	(use tick		(√)	Sem	Sem
	(if any)		marks)		~ /	0	0
7.	<b>Total Numbe</b>	r of Lectures, Tutorials, Practic	al (assuming 12 we	eks of o	ne sem	ester)	
Le	ectures = 36		Tutorials = 0	Practi	cal = 0		
8.	Brief Syllab	us					
	i. Strate	egies and Skills Required for Care	er building/Recruitn	nent/ Te	am buil	ding	
	ii. Grou	p Discussion and Role Play	U			U	
	iii. Busir	ness/job Correspondence					
	iv. Time	and Work, Data Interpretation					
	v. Algel	ora and Simple Reasoning					
9.	Learning ob	piectives:					
	1. Nego	tiation skills					
	2. Team	n work					
	3. Read	v to apply for a job					
	4. Imple	ementing logical Aptitude in decis	ion making				
10	, Course Out	comes (COs):	8				
	i. able t	o get an idea of industry perspecti	ve				
	ii. able t	o develop a logical thought proce	ss related to every a	spect of	life		
	iii. to int	erpret data and convert it into info	rmation	speer or			
	iv able t	o hold meaningful group discussi	ons				
	v able t	o develop and respond to daily sit	uations using critica	l think ir	ησ		
	V. dbie t	wise detailed content	dations using entited		15		
	Onit	wise detailed content					
U	nit-1	Number of lectures =9	Title of the unit: S	Strategie	s and S	kills Rea	uired
0.			for Career building	Recruit	ment/ T	Team buil	ding
Le	earning of diffe	erent strategies to be used. Negotia	ation Assertions Po	liteness	through	Convers	sation.
A	ssertive Strates	vies. Leadership Skills. Team Wor	k. Management Ski	lls throu	gh Groi	in Activi	ties
		, ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			8	-p	
U	nit - 2	Number of lectures = 9	Title of the unit: (	Group D	iscussic	on and Ro	ole Play
Li	stening and Sp	eaking Comprehension through C	Broup Discussion and	d audio-	visual a	ids, Doʻs	and
Don'ts of Group Discussions related to various topics (Day- Today life/Social Issues/Political and							
others							
U	nit - 3	Number of lectures = 9	Title of the unit: I	Business	/job Co	rrespond	ence
Re	esume Writing	, Letter Writing, Job Application 1	Letter				
Li	near and Qua	adratic Equation, Function Basi	ics, Inequalities, P	rogressi	on, Set	Theory	/ Venn
Di	iagram, Pie C	hart, Permutation and Combinati	on, Probability, Vis	sual reas	soning,	Alphabe	t based
re	reasoning						

Unit - 4	Number of lectures – 9	Title of the unit: Time and Work data			
0mt - 4	Number of feetures = 7	Inte of the unit. This and Work, data			
		Interpretation			
Time and Work,	Time speed distance, Table, Line	Graph, bar Graph, Cube, Dice, Calendars, Test on			
Pie and Bar Cha	rts, Comprehensive Practice Test-	I on Area Covered, Comprehensive Practice test-2			
on Area Covered	d				
vi. Brief	f Description of self learning / E-	learning component			
The stud	ents will be encouraged to learn us	sing the SGT ELearning portal and choose the			
relevant	lectures delivered by subject expe	rts of SGT University.			
The link	to the E-Learning portal:				
https://el	earning soluniversity ac in/course	-category/general/			
	earning.sgtuniversity.ac.in/course	<u>europorty-general-</u>			
vii. Book	as Recommended (3 Text Books	+ 2-3 Reference Books)			
1. Sanjay Ku	umar and PushpLata _Communica	tion Skills', OUP 2012			
2. Raymond	Murphy _Essential English Gram	mar', Cambridge University Press 1998			
3. Meenaksh	i Raman and Sangeeta Sharma _T	echnical Communication Principle and Practice',			
OUP 2012					
4. Meenakshi Raman and Prakash _Business Communication' OUP 2011					
5. HorySaml	karMukerjee _Business Communi	cation Connecting at Work' OUP 2013			

1Name of the De	epartment	CIVIL H	ENGINEERING	J		
2Course Name	Air and	L	Т		Р	
	Noise					
	Pollution					
3Course Code	13450507	3	0		0	
4Type of Course (use tick		Core ()	<b>PE</b> ()		<b>OE</b> (✓)	
mark)						
5Pre-requisite	Nil	1. Frequency	Even ()	Odd ()	Either	Every
(if any)		(use tick			Sem	Sem
		marks)			(✔)	0
(Total Number of Leatures, Tyterials, Prestical (assuming 12 weeks of one somestar)						

6Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)Lectures = 36Tutorials = 0Practical =0

## **Brief Syllabus:**

Increased air and noise pollution is the common impact of industrialization lead to the several dangerous and untreatable impacts on human beings. Students learn about air pollutants, particulates and gaseous pollutants, effects of air pollution on human beings, elements of atmosphere and dispersion of pollutants, meteorological factors, principles and design of air pollution control measures, air quality monitoring, air pollution control measures, sources of noise pollution, environmental and industrial noise and effects of noise pollution.

## 7.Learning objectives:

1. To understand the aspects of atmospheric pollution and its flow.

2. To know about the issues such as atmospheric composition, monitoring, acidic deposition, urban air quality

3. To understand the use and application of air quality models for the identification of plume flow.

# 8.Course Outcomes:

On completion of this course, the students will be able to

1. The main chemical components and reactions occur in the atmosphere and examine the factors responsible for perturbing this.

2. The Implementation of the methods for monitoring and modeling spatial and temporal patterns of pollution

3. The air pollution issues at a range spatial scales and how these are relaxed.

4. The environmental impacts of atmospheric pollutants and assess their concentration.

9Unit wise detailed content				
Unit-1	Number of	Title of the unit:		
	lectures = 9	Sources and Effects of Air Pollution		
Classification of air pollutants – Particulates and gaseous pollutants – Sources of air pollution –				
Source inventory – Effects of air pollution on human beings, materials, vegetation, animals –				
global warming-o	zone layer deple	tion, Sampling and Analysis – Basic Principles of Sampling –		
Source and ambie	ent sampling – A	nalysis of pollutants – Principles.		
<b>Unit</b> – 2	Number of	Title of the unit:		
	lectures = 9	Transport of Air Pollution		
Elements of atmo	sphere and dispe	rsion of pollutants – Meteorological factors – Wind roses –		
Lapse rate - Atmo	ospheric stability	and turbulence – Plume rise – Dispersion of pollutions –		
Gaussian dispersion models – Applications				
Unit - 3	Number of	Title of the unit: Control of Air Pollution		
	lectures = 9			

Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation – Selection criteria for equipment, gaseous pollutant control by adsorption & absorption, condensation, combustion – Pollution control for specifi c major industries.

Unit - 4	Number of	Title of the unit:		
	lectures = 9	Air Quality Management		
Air quality standards – Air quality monitoring – Air pollution control eff orts – Zoning – Town				
planning regulation of new industries – Legislation and enforcement – Environmental Impact				
Assessment – Methods.				

**10Brief Description of self learning / E-learning component** 

#### 11Books Recommended Text Books

1 M N Rao& H V N Rao (2007), Air Pollution, Tata McGraw-Hill Publishing Company, 26th reprint, New Delhi.

2. Noel De Nevers (2010), Air Pollution Control Engineering, 2nd Edition, Waveland Press, Inc., Long Grove, Illinois.

## **Reference books**

1. Singal, S.P. (2000), Noise Pollution and Control, First Edition, Narosa Publishing House, New Delhi.

2. Rao C.S. (2006) Environmental Pollution Control Engineering, 2nd edition, New Age International, New Delhi.

3. William L.Heumann (1997), Industrial Air Pollution Control Systems, McGraw Hill Professional, New York.

1. Name of the Department- ELECTRONICS & COMMUNICATION ENGINEERING						
2. Course Name	Sensor and Architecture interfacing	L	Т	Р		
3. Course Code	13450508	3	0	0		
4. Type o	Course (use tick mark)	Core ()	<b>PE()</b>	<b>OE</b> (√)		
5. Pre- requisite (if any	,	6. Frequency (use tick marks)	Even Odd () ()	Either Every Sem Sem		
				$(\mathbf{v})$ $(0)$		
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)				lester)		
Lectures = 30 I utorials = 0 Practical =						
This course deals with the different type of sensors, transducers and their interfacing with microcontrollers. This also describes their role to know the domain status. It also deals with the process to further processing of sensing elements. 9. Learning objectives:						
1. Educate st	dents to understand the functioning	g of different types of sensors & the	er role in orde	r to sense		
various parameters.						
10. Course Out	omes (COs):	ters in the real time application to e	control the wor	king.		
At the end of the	e course, the students will be able t	0				
1. Explain sta	ic and dynamic characteristics and	operating principle of Inductive, ca	pacitive, mag	netic, piezo		
electric, radiati	on, electro chemical sensors.					
2. Illustrate the	importance of standard of calibration	on				
3. Select suitab	e sensor for a given automobile, ae	pronautics, machine tools and manu	facturing appl	ication		
11.	Unit wise detailed content					
Unit-1     Number of lectures = 9     Introduction						
Definition, Measurement Techniques, Classification of errors, Error analysis, Static and dynamic characteristics of						
transducers, Performance measures of sensors, Classification of sensors, calibration techniques.						
<b>Kesistance, inductance and Capacitance Transducers</b> : Potentiometer, strain gauges, optical encoders, LVDT, DVDT, Supervised Microsum						
Applications: Prossure position angle and acceleration Conscitance singuity. Eachaster type condenses						
microphone frequency modulating oscillator circuit Dynamic capacitance variation $\Delta C$ Bridge for Amplitude						
Modulation, Applications: Proximity, microphone, pressure, displacement						
Unit - 2Number of lectures =9Piezoelectric & Magnetic Sensors						
Piezoelectric Materials and properties, Modes of deformation, Multi-morphs, Environmental effects, Applications:						
Accelerometer, ultrasonic. Magnetic Sensors, types, principle, requirement and advantages: Magneto resistive. Hall						
Effect – Eddy current.						
Radiation and Electro Chemical Sensors: Photo conductive cell, photo voltaic. Photo resistive. Fiber ontic sensors.						
Ray and Nuclear radiation sensors, Electro chemical sensors: Electrochemical cell, Polarization, sensor Electrodes						
and electro-ceramics in Gas Media.						
Unit – 3	Number of lectures = 9	Modern Sensors				
Film sensors, micro-scale sensors, Particle measuring systems, Vibration Sensors, SMART sensors, Machine						
Vision, Multi-sensor systems						
Applications of Sensors: Applications and case studies of Sensors in Automobile Engineering, Aeronautics,						

Machine tools and Manufacturing processes.

Unit – 4	Number of lectures = 9	Applications and architecture interfacing		
Interfacing of LEDs, 7 Segment display device, LCD display, DIP Switches, Push Button switches, Key denounce				
techniques, Keyboard connections load per key and matrix form, Interfacing A/D converter, D/A converter, Relay,				
opto isolator stepper motor and DC motor.				
12. Brief Description of self learning / E-learning component				
The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered				
by subject experts of SGT University.				
The link to the E-Learning portal.				
https://elearning.sgtuniversity.ac.in/course-category/				
Journal papers; Patents in the respective field.				
13. Books Recommended				
Text Book:				
1. Patranabis D., Sensor and Actuators, Prentice Hall of India (Pvt) Ltd., 2005.				
Reference Book:				
2. Renganathan S., Transducer Engineering, Allied Publishers (P) Ltd., 2003.				