RGPV (DIPL BHO	OMA WING) PAL	OBE C	RMAT- 3	Sheet No. 1/3			
Branch		ER SCIENCE AN	ND		Semester	FIFTH	
Course Code	Course Code Course Name CLOUD COMPUTIN						
					<u>(Hrs)</u>	<u>(Marks)</u>	
Course Outcome 1 EXPLAIN THE FUNDAMENTALS OF CLOUD COMPUTING					20	20	
Learning Outcome 1 Explain the basics and technological importance of Cloud Computing.					10	ET(10)	
Contents	advanta cloud c • Compu cluster	age and disadvantag omputing, applicatio ting models: deskto	mputing, history of cloud comp ges of cloud computing, challen ons of cloud computing. op computing, client-server comp nputing, cloud computing.	ges o	f		
Method of Assessme		•	ATION				
Learning Outcome 2	2 Identify the va computing	rious attributes, ele	ements and actors of cloud		10	PT(10)	

Contents	 Cloud attributes: elasticity, multi-tenancy, pay per uses, scalability, self-provisioning of resources, geographical freedom. Cloud elements: client/user (mobile, stationary, thin, and thick), data centre, manager, hosts, and distributed server. Actors of cloud: cloud service provider, cloud broker, client/cloud user. 		
Method of Assessment	INTERNAL THEORY EXAMINATION / PROGRESSIVE TEST(PT)		
Course Outcome 2	EXPLAIN THE CONCEPT OF CLOUD DEPLOYMENT MODEL	15	20
Learning Outcome 3	Discuss concept, characteristics and challenges of public & private cloud.	8	ET(10)
Contents	 Public Cloud: characteristics, suitability, issues with public cloud, advantages and disadvantages. Private Cloud: characteristics, suitability, on-premise private cloud, issues with on-premise private cloud, outsourced private cloud, issues with outsourced private cloud, advantages and disadvantages. 		
Method of Assessment	END TERM THEORY EXAMINATION		
Learning Outcome 4	Discuss concept, characteristics and challenges of community & hybrid cloud.	7	ET(10)

Contents	 Community Cloud: characteristics, suitability, On-Premise Community Cloud, issues with On-Premise Community Cloud. Outsourced Community Cloud, issues of Outsourced Community Cloud, advantages and disadvantages. Hybrid Cloud: characteristics, suitability, issues with hybrid cloud, advantages, disadvantages, differentiate among public, private, community and hybrid cloud. 		
Method of Assessment	END TERM THEORY EXAMINATION		
Course Outcome 3	INTERPRATE VARIOUS CLOUD SERVICE MODELS.	15	20
Learning Outcome 5	Define concept, characteristics, and benefits of Infrastructure as a Service (IaaS) & Platform as a Service (PaaS)	8	ET(10)
Contents	 Cloud Service models: Introduction, Infrastructure as a Service (Iaas): characteristics, suitability, IaaS providers, pros and cons of IaaS. Platform as a Service (PaaS): Characteristics, suitability, PaaS providers, pros and cons of PaaS. 		
Method of Assessment	END TERM THEORY EXAMINATION		
Learning Outcome 6	Define concept, characteristics, and benefits of Software as a Service (SaaS).	7	TW(10)
Contents	Software as a Service (SaaS): characteristics, suitability, pros and cons of SaaS, SaaS providers, differentiate between IaaS, PaaS, and SaaS.		
Method of Assessment	INTERNAL QUIZ / ASSINGMENT		

Course Outcome 4	DISCUSS THE ROLE OF VIRTUALIZATION AND LOAD BALANCING IN CLOUD COMPUTING.	20	20
Learning Outcome 7	Explain the importance of virtualization in Cloud Computing.	10	PT2(10)
Contents	 Virtualization: Introduction, Types of Virtualization: Full virtualization, Para Virtualization, Hardware assisted Virtualization. Areas of virtualization in cloud: Server, Network, Storage Virtualization. Virtualization Architecture: Hosted Architecture, Bare metal architecture, Service level Agreement (SLA), Quality of Services (QoS), Virtual Machine, VM Migration. 		
Method of Assessment	INTERNAL THEORY EXAMINATION / PROGRESSIVE TEST(PT)		
Learning Outcome 8	Explain load balancing and it's types.	10	ET(10)
Contents	 Load balancing: Introduction, Types of load balancing: Static load balancing (Deterministic, Probabilistic), Dynamic load balancing (Centralised, Distributed). Power Consumption issues in cloud computing, Server Consolidation. 		
Method of Assessment	END TERM THEORY EXAMINATION		
Course Outcome 5	EXPLAIN THE BASIC CONCEPTS OF CLOUD SECURITY.	20	20

Learning Outcome 9	Identify core concepts of the network security & the security threats in Cloud Computing.	10	ET(10)
Contents	 Fundamentals of network security, Security threats: types of attacks, security services, Encryption, Decryption and Cryptography: Types of Cryptography (public key cryptography & symmetric key cryptography). Security issues associated with the cloud computing, Security Techniques for Data Protection in Cloud Computing: Authentication, Confidentiality, Access Control, and Authorization in Cloud Computing. 		
Method of Assessment	END TERM THEORY EXAMINATION		
Learning Outcome10	List some important cloud computing driven commercial systems and applications	10	ET(10)
Contents	Cloud Service Providers and its features: AWS (Amazon Web Services), Microsoft Azure, Oracle cloud, Google Cloud Platform, Rackspace, Cloud Security Alliance (CSA) Stack model.		
Method of Assessment	END TERM THEORY EXAMINATION		

REFERENCES-

S No.	Title and Publication	Authors
1.	Essentials of Cloud Computing, CRC press	K. Chandrasekaran
2.	Handbook of Cloud Computing, Springer	Borko Furht, Armando Escalante (Editor)
3.	Detailed analysis of various load balancing and power reduction methodology in cloud environment, IJARCS	Kamal Narayan Budholia, Satish Pawar

4.Data Communication and Networking (4th Edition)Behrouz A. Forouzan	
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	(Diplon	na Wing) Bhopal	SCHEI	ME FOR LEAR	NING	Bra	inch C	ode	Со	ourse C	ode	CO Code	LO Code		
				OUTCOME		С	0	4				1	1	Format No. 4	
Course	Name	CLOUD COMPUTIN	G												
CO Des	scription	EXPLAIN THE FUNI	DAMENTA	ALS OF CLOUD	COMPU	TINC	3.								
LO Des	scription	Explain the fundamen	tals and tee	chnological aspec	cts of Clo	ud Co	ompu	ting.							
				SCHEME	OF STU	DY									
S. No.	. No. Learning Content			Teaching – Learning Method	Descrip Process	tion o	f T-L	Teac Hrs.	ch	Prac Tut.	-	LRs R	equired	Remarks	
1	 Introduction to cloud computing, history of cloud computing, advantage and disadvantages of cloud computing, challenges of cloud computing, applications of cloud computing. Computing models: desktop 		cloud and cloud cloud s of esktop	Traditional Lecture method + Handout	Teacher explain contents provide students	the and hando	out to	1	0		0	Hande Books Conte	s / E-	NIL	
	c g c	omputing, client omputing, cluster comp rid Computing, omputing. Cloud layered architecture	cloud												
				SCHEME OF	ASSESS	MEN	т								
S. No.	Method	of Assessment	Descriptio	n of Assessment		ximuı ⁄Iarks	m	F	Reso	urces	Requi	red	Exte	ernal / Internal	
1		ERM THEORY NATION	define clou	ll be asked to id computing als, explain models.		10		Test Paper			External				

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEAR	NING Branch	Code C	Course Code		LO Code	Л	
		OUTCOME	C 0	4		1	2	Format No. 4	
Course	Name	CLOUD COMPUTING							
CO Des	cription	EXPLAIN THE FUNDA	MENTALS OF CLOUD	COMPUTING.					
LO Des	cription	Identify the various attri	butes, elements and actor	rs of cloud comput	ing				
			SCHEME	OF STUDY					
S. No.	Learning	g Content	Teaching – Learning Method	_		Pract./ Tut. Hrs	LRs Required		Remarks
1	r s r f • (((t t h • /	Cloud attributes: elasti nulti-tenancy, pay per u calability, self-provisioning esources, geograph reedom. Cloud elements: client/ mobile, stationary, thin, hick), data centre, mana nosts, and distributed server. Actors of cloud: cloud service provider, cloud broker, client/cloud user.	ises, g of hical user and ager,	Teacher will explain the contents and provide handout to students.	10	0	Hand Book Conte	s / E-	Teacher may use working animation for Searching techniques
	•			ASSESSMENT					

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	INTERNAL THEORY EXAMINATION / PROGRESSIVE TEST(PT)	Student will be asked to explain cloud elements and cloud attributes	10	Test Paper	Internal
	ADD	ITIONAL INSTRUCTIONS FO	R THE HOD/ FAC	CULTY (IF ANY)	

RGPV (Diplor		ma Wing) Bhopal	SCHEME FOR LEAF	SCHEME FOR LEARNING			Branch Code		Course Code		CO Code	LO Code	
			OUTCOME	OUTCOME		0	4				2	3	Format No. 4
Course	Name	CLOUD COMPUTING											
CO Des	scription	ILLUSTRATE THE CO	ONCEPT OF CLOUD DE	PLOYM	ENT M	[OD]	EL						
LO Des	cription	Discuss the concept of p	ublic & private cloud, the	eir charac	teristic	s and	d chal	lenge	es.				
			SCHEME	OF STU	DY								
S. No.	Learning	g Content	Teaching – Learning Method	Descript Process		T-L	Teac Hrs.		Pract Tut.	-	LRs Re	equired	Remarks
1	• H	Public Cloud: characteri uitability, issues with p loud, advantages lisadvantages. Private Cloud: characteristic uitability, on-premise priva loud, issues with on-premise private cloud, outsourced pr	Traditional stics, Lecture ublic method + and Handout es, te se	Teacher explain contents provide students	the and handou	it to	5	3	C)	Hando Books Conte	s / E-	NIL

	cloud, issues with out private cloud, advanta disadvantages.					
		SCHEME OF A	SSESSMENT			
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal	
1	END TERM THEORY EXAMINATION	Student will be asked to define public & private cloud.	10	Test Paper	External	
	A	DDITIONAL INSTRUCTIONS FO	R THE HOD/ FAC	CULTY (IF ANY)		

RGPV	(Diplon	na Wing) Bhopal	SCHEME FOR LEAR OUTCOME	NING	Bra C	nch C 0	ode 4	Course Code		ode	CO Code 2	LO Code 4	Format No. 4
Course	D Description ILL	CLOUD COMPUTING											
CO Des	cription	ILLUSTRATE THE CO	ONCEPT OF CLOUD DE	PLOYMI	ENT I	MOD	EL						
LO Dese	cription	Discuss the concept of (Community & hybrid cloue	d, their ch	aract	terist	ics an	d cha	lleng	es.			
		1	SCHEME	OF STU	DY								
S. No.	Learning	g Content	Teaching – Learning Method	Descript Process	ion o	f T-L	Tea Hrs		Prac Tut.	•	LRs R	equired	Remarks
1	С	haracteristics, suitability,	oud: Traditional On- Lecture oud, method +	Teacher explain t contents	he			7		0	Hande Books Conte	s / E-	NIL

External / Internal
External

PCDV (Diplo	ma Wing) Bhopal	SCHEME FOR LEARNING	Bra	inch C	ode	Course C	ode	CO Code	LO Code	
	ma wing j briopai	OUTCOME	С	0	4			3	5	Format No. 4
Course Name	CLOUD COMPUTING									
CO Description	EXPLAIN THE CONC	EPTS, CHARACTERISTICS, ANI	D BEI	NEFI	TS OI	F CLOUD	SERV	VICE N	IODE	LS
LO Description	Define the concepts, cha	racteristics, and benefits of Infrast	ructu	re as	a Ser	vice (IaaS)	& Pla	atform	as a Se	ervice (PaaS)

				SCHEME	OF STU	DY							
S. No.	Learning	; Content		Teaching – Learning Method	Descrip Process		f T-L	Teac Hrs.		act./ It. Hrs	LRs R	equired	Remarks
1	I S s a • F C	Cloud Service r ntroduction, Infrastructu kervice (Iaas): characte uitability, IaaS providers nd cons of IaaS. Platform as a Service (Paa Characteristics, suitability roviders, pros and cons o PaaS.	eristics, s, pros (S): (, PaaS	Traditional Lecture method + Handout	Teacher will explain the contents and provide handout to students.			8		0	Handouts / Books / E- Contents		NIL
				SCHEME OF	ASSESSMENT								
S. No.	Method	of Assessment	Descrip	otion of Assessment	-	ximu /larks	n	R	esource	s Requ	ired	Exte	rnal / Internal
1		CRM THEORY NATION		t will be asked to e IaaS & PaaS. 10				Test	Paper			External	
		ADDI	TIONAI	L INSTRUCTIONS F	OR THE	HOD	/ FAC	CULTY	(IF AN	Y)			
	/=		SCH	HEME FOR LEAR	NING	Bra	nch Co	ode	Course	Code	CO Code	LO Code	
RGPV	(Diplon	na Wing) Bhopal		OUTCOME		С	0	4			3	6	Format No. 4
Course	Name	CLOUD COMPUTIN	G					·					
CO Des	cription	EXPLAIN THE CON	CEPTS,	, CHARACTERIST	ICS, AN	D BEN	NEFI	rs of	CLOU	D SER	VICE N	IODEL	S
LO Des	cription	Define the concepts, c	haractei	ristics, and benefits	of Softwa	re as a	a Serv	vice (Sa	naS).				
				SCHEME	OF STU	DY							
S. No.	Learning	; Content		Teaching –	Descrip Process		f T-L	Teac Hrs.		act./ It. Hrs	LRs R	equired	Remarks

1	• Software as a Service (Saal characteristics, suitability, and cons of SaaS, SaaS providers, differentiate betw IaaS, PaaS, and SaaS.	pros Lecture method +	Teacher will explain the contents and provide handout to students.	7	Bool		0 Handouts / Books / E- Contents		
		SCHEME OF	ASSESSMENT						
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resou	Resources Required		External / Int		
	INTERNAL QUIZ / ASSINGMENT	Student will be asked to differentiate between IaaS, PaaS, and SaaS.	10	Quiz /	Quiz / Assignment		s Internal		
	ADDIT	IONAL INSTRUCTIONS F	OR THE HOD/ FAC	JLTY (IF	ANY)				
	ADDIT	IONAL INSTRUCTIONS P							

BCDV (Diplo	ma Wing) Bhopal	SCHEME FOR LEARNING	Bra	inch Co	ode	Cοι	urse Co	ode	CO Code	LO Code	1
	ina wing j bilopai	OUTCOME	С	0	4				4	7	Format No. 4
Course Name	CLOUD COMPUTING	ł									
CO Description	DESCRIBE IMPORTA	NCE OF VIRTUALIZATION IN	CLOU	U D C O	OMP	UTIN	G AN	D L(DAD B	ALAN	CING
LO Description	Know the importance o	f virtualization in Cloud Computin	g.								
		SCHEME OF STU	DY								

S. No.	Learning Content	Teaching –	Description of T-L	Teach	Pract./	LRs Required	Remarks
1	 Virtualization: Introduct Types of Virtualization: virtualization, Virtualization, Hard assisted Virtualization. Areas of virtualization cloud: Server, Network Storage Virtualization. Virtualization Architectur Hosted Architecture, Bar architecture, Service lever Agreement (SLA), Qualit Services (QoS), Virtual Machine, VM Migration. 	FullLectureParamethod +wareHandoutn ininvork,re:e metallelty of	Process Teacher will explain the contents and provide handout to students.	Hrs. 10	Tut. Hrs 0	Handouts / Books / E- Contents	NIL
			ASSESSMENT		1	1	1
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Reso	urces Requi	red Exter	nal / Internal
1	INTERNAL THEORY EXAMINATION / PROGRESSIVE TEST(PT)	Student will be asked to explain Virtualization	10	ſ	Fest Paper		Internal
		ITIONAL INSTRUCTIONS F		чи т у /іс			

	ma M/ing) Bhanal	SCHEME FOR LEARNING	Bra	nch Co	ode	Οοι	irse Co	ode	CO Code	LO Code	Л
	ma Wing) Bhopal	OUTCOME	С	0	4				4	8	Format No. 4
Course Name	CLOUD COMPUTING	r r									

LO Des	cription	Explain load balan	icing and its	s types.					
				SCHEME	OF STUDY				
S. No.	Learning	g Content		Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract./ Tut. Hrs	LRs Required	Remarks
1	T la P b L C	Load balancing: Introduction, Types of load balancing: Static load balancing (Deterministic, Probabilistic), Dynamic load balancing (Centralised, Distributed). Power Consumption issues in cloud computing, Server Consolidation.		Traditional Lecture method + Handout	Teacher will explain the contents and provide handout to students.	10	0	Handouts / Books / E- Contents	NIL
				SCHEME OF	ASSESSMENT				
S. No.	Method	of Assessment	Descrip	otion of Assessment	Maximum Marks	Reso	urces Requi	red Exter	nal / Internal
1		ERM THEORY NATION		t will be asked to Load balancing	10	,	Test Paper]	External
		AC	DITIONAL	LINSTRUCTIONS F	OR THE HOD/ FAC	CULTY (IF	ANY)		

PCDV (Diplo	ma Wing) Bhopal	SCHEME FOR LEARNING	Bra	nch Co	ode	Со	urse Co	ode	CO Code	LO Code	/
	ina wing / bhopai	OUTCOME	С	0	4				5	9	Format No. 4
Course Name	CLOUD COMPUTING										

CO Des	cription	EXPLAIN THE BA	SIC CON	CEPTS OF CLOUE	SECURITY.				
LO Des	cription	Identify the core co	ncepts of t	he networking secu	rity & the security th	reat in Cl	loud Comp	uting.	
				SCHEME	OF STUDY				
S. No.	Learning	Content		Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract./ Tut. Hrs	LRs Required	Remarks
1	S S S S S S S S S S S S S S S S S S S	f attacks, security Encryption, Decryptic Cryptography: Typ Cryptography (publ ryptography & symm ryptography). Security issues associat he cloud computing, S Cechniques for Data Pr n Cloud Computing:	urity, Security threats: types attacks, security services, cryption, Decryption and /ptography: Types of /ptography (public key ptography & symmetric key ptography). curity issues associated with cloud computing, Security chniques for Data Protection Cloud Computing: thentication, Confidentiality, cess Control, and thorization in Cloud		Teacher will explain the contents and provide handout to students.	10	0	Handouts / Books / E- Contents	NIL
				SCHEME OF	ASSESSMENT				
S. No.	Method	of Assessment	Descrip	tion of Assessment	Maximum Marks	Reso	urces Requi	red Exte	rnal / Internal
1		ERM THEORY NATION	describ network security	t will be asked to e fundamentals k security and y issues associated bud computing.	10	ŋ	Fest Paper		External
					OR THE HOD/ FAC				

	GPV (Diploma Wing) Bhopal	a Wing \ Phonal	SCHEME FOR LEAR	NING	Bra	anch (ode	Co	ourse C	ode	CO Code	LO Code	
KGPV	וטוקוטו	na wing j briopai	OUTCOME		С	0	4				5	10	Format No.
Course I	Name	CLOUD COMPUTIN	G		•								
CO Desc	cription	EXPLAIN THE BASI	C CONCEPTS OF CLOUI) SECUR	ITY.								
LO Desc	ription	Explore some importa	nt cloud computing driven	commerc	ial sy	stem	s and	appli	ication	s.			
			SCHEME	OF STU	DY								
S. No.	Learning	g Content	Teaching – Learning Method	Descrip [®] Process		of T-L	Tea Hrs	ach 5.	Prac Tut.	-	LRs R	equired	Remarks
1	featur Servie cloud Racks	d Service Providers and it res: AWS (Amazon Web ces), Microsoft Azure, O , Google Cloud Platform space, Cloud Security Al .) Stack model.	racle Method + , Handout	Teacher explain contents provide students	her will her the ents and de handout t			10)	Hande Books Conte	s / E-	NIL
			SCHEME OF	ASSESS	MEN	Т							
S. No.	Method	of Assessment	Description of Assessment	-	iximu /larks			Reso	urces	Requ	red	Exte	ernal / Internal
1		ERM THEORY INATION	Student will be asked to enlist Cloud Service Providers and its features.		10			,	Fest Pa	aper			External
		ADDI	TIONAL INSTRUCTIONS I	OR THE	HOD)/ FA	CULI	'Y (IF)			