RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	0	3	5	0	1	1	
							1	1	

COURSE NAME	**Data and Computer Networking**
CO Description	Explain the fundamentals of computer network.
LO Description	Classify different computer networks and servers.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-01	Parallel vs serial transmission ; Definition, Benefits and Components of computer network, Classification of Network by their Geography: PAN, CAN, LAN, MAN, WAN, Classification of Network by their Component Role: Peer-to-Peer Network, client-Server Network, Different type of servers: web server, mail server, data server, DNS server, Topologies of network: Bus, Ring, Star, Mesh, Tree	Interactive classroom lecture, PPT, demonstration, quiz, assignments	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/ assignments/ tutorial.	6	-	Text Books, PPT, Handouts, chalk board, charts.Videos lectures- NPTEL& others	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-01	End Semester Theory Exam	**Student will be asked to**(and/or): 1. Classify PAN, CAN, LAN, MAN, WAN 2. Compare Peer-to-Peer Network, client-Server Network 3. Define Different type of servers: web server, mail server, data server	10	Question paper, Rating scale	External

		4. Distinguish between Bus, Ring, Star, Mesh, Tree				

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

			Branch Code			Course Code			CO Code	LO Code	
RGPV (Diploma Wing) Bhopal		**SCHEME FOR LEARNING OUTCOME**	E	0	3	5	0	1	1	2	Format No. **4**

COURSE NAME	**Data and Computer Networking**
CO Description	Explain the fundamentals of computer network.
LO Description	Compare different codes and switching methods.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-02	Types of switching: Circuit switching, message switching, packet switching, virtual circuit switching, Text codes:-ASCII, Unicode; Error codes- REC,FEC; Parity code, Block code, Hamming code, CRC code	Interactive classroom lecture, PPT, demonstration, quiz,assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct quiz/assignments/ tutorial to make students practice their knowledge.	8	-	Text Books, PPT, Handouts, chalk board, charts, Numerical Problems Workbook	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-02	End Semester Theory Exam	**Student will be asked to**(and/or): 1. Differentiate Circuit switching, message switching, packet switching, virtual circuit switching. 2. Describe ASCII, Unicode 3. Describe Parity code, Block code, Hamming code, CRC code	10	Question paper, Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*5*	*0*	*1*	*1*	*3*	

COURSE NAME	Data and Computer Networking
CO Description	Explain the fundamentals of computer network.
LO Description	Describe Security services used in computer network.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks

| LO-03 | Definition of network security, Types of security services-password, Biometric, captcha, antivirus, firewall Encryption: symmetric key, Asymmetric key, digital signature | Lab demonstration, hands on practice, lab assignments, V-Lab. | • Teacher will explain the content in class/lab.
• Teacher with support from lab staff will demonstrate the procedure of lab experiments.
• Student will conduct lab assignment based on these experiments. | 4 | -- | Lab manual, charts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet. | |

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-03	Internal Assignment/ Progressive test	Student will be asked to 1. Explain need of network security. 2. Describe password, Biometric, captcha, antivirus, firewall 3. Differentiate Encryption: symmetric key, Asymmetric key 4. Define digital signature	10	Rubrics/Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code			CO Code	LO Code	Format No. 4
		E	0	3	5	0	1	2	4	

COURSE NAME	Data and Computer Networking
CO Description	Identify different network devices and transmission media.
LO Description	Define different types of networking devices.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-04	Need of Networking devices, Introduction and applications of NIC, Repeater, Bridge, Switch, Router, Gateway, Modems-DSL, ADSL, band splitter, media convertor, WiFi adapter card, Wifi access point	Interactive classroom lecture, PPT, demonstration, quiz,assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	-	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-04	Question Paper - External- End Sem Exam	**Student will be asked to**(and/or): 1. Describe band splitter, media convertor, WiFi adapter card, Wifi access point 2. Differentiate NIC, Repeater, Bridge, Switch, Router, Gateway, 3. Compare Modems-DSL, ADSL	10	Question paper, Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*5*	*0*	*1* *2*	*5*	

COURSE NAME	Data and Computer Networking
CO Description	Identify different network devices and transmission media.
LO Description	Set-up and configure a Local Area Network

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-05	Setup and configure a LAN network using network devices (routers, switches etc), Configure user devices Identify Transmission media. Identify MAC address, IP address	Lab demonstration, PPT, hands on practice, lab assignments	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments.	--	8	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-05	Practical test in laboratory	**Student will be asked to**(and/or): 1. Prepare Ethernet cable 2. Setup and configure a LAN network using network devices (routers, switches etc) 3. Configure user devices.	10	Question paper + Rating scale.	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*5*	*0*	*1*	*2*	*6*

COURSE NAME	**Data and Computer Networking**
CO Description	Identify different network devices and transmission media.
LO Description	Compare different types of transmission media and media access methods.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-06	Need of Transmission Media, Selection Criteria. Guided Media: Unguided Media: Types of cables, introduction, characteristics and comparison of: Twisted Pair Cable, STP, UTP, Ethernet cable, Co-axial Cable, Fiber Optic Cable.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

Selection Criteria. Unguided Media: Types of Communication Bands, Radio wave Communication, Microwave Communication, Infrared Communication, Satellite band. Frequency, Bandwidth and application. Definition of Media access; Media access methods: Polling, Token passing, CSMA/CA.		knowledge.			

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-06	Internal Assignment-Progressive	**Student will be asked to** 1. Compare guided transmission media. 2. Distinguish between various Media Access Methods. 3. Identify Frequency band of given unguided communication band. 4. Enumerate selection criteria of guided Transmission media.	10	Rubrics, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		E	**0**	**3**	**5**	**0**	**1**	**3**	**7**	

COURSE NAME	Data and Computer Networking
CO Description	Compare OSI model and TCP/IP protocol suite.

LO Description	Illustrate OSI Reference Model Concept.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-07	Introduction of OSI model – Layered Architecture, Peer-to- Peer Processes, Protocols, Encapsulation.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
Lo-07	End Semester Theory Exam	Student will be asked to(and/or): 1. Describe layered architecture of OSI model. 2. Define Peer-to- Peer Processes and Encapsulation with suitable diagram 3. Explain Functions of each Layers of OSI model.	10	Question paper , Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code			CO Code	LO Code	Format No. 4
		E	0	3	3	0	1	3	8

COURSE NAME	Data and Computer Networking
CO Description	Compare OSI model and TCP/IP protocol suite.
LO Description	Define TCP/IP protocol suite and related protocols.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-08	Layers in the TCP/IP Protocol Suite, Comparison between OSI and TCP/IP Protocol Suite. Introduction of Protocols: PPPOE, ARP, RARP, IP, UDP, TCP, Http, Ftp, Telnet, SMTP, IMAP & POP.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-08	End Semester Theory Exam	**Student will be asked to** (and/or): 1. Explain Functions of each Layers of TCP/IP protocol suite. 2. Compare OSI model and TCP/IP Protocol Suite. 3. Define TCP/IP Protocols: PPPOE, ARP, RARP, IP, UDP, TCP, Http, Ftp, Telnet, SMTP, IMAP & POP.	10	Question paper , Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code		Course Code			CO Code	LO Code	Format No. 4
		E	0	3	5	0	1	3	9

COURSE NAME	Data and Computer Networking
CO Description	Compare OSI model and TCP/IP protocol suite.

LO Description	Interpret addressing in TCP/IP network

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-09	Addressing- MAC address; IP Address IPv4, Class full address, Classless address, Netid, Hostid, Sub-netting, super-netting, Masking; IPv6; Port Address; URL; Domain name system	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-09	End Semester Theory Exam	Student will be asked to 1. Compare MAC address, IP address, Port address 2. Describe MAC address format. 3. Classify IP address. 4. Define subnetting, supetnetting, masking.	10	Rubrics, Rating scale	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	0	3	5	0	1	4	
							4	**10**	

COURSE NAME	Data and Computer Networking
CO Description	Manage computer network and host websites.
LO Description	Install and configure application layer software.

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SCHEME OF STUDY

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S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-10	Install and configure Web browser and OS firewall. Client software of email (outlook, thunderbird), telnet (dos, putty etc.) and ftp (FileZilla).	Lab demonstration, PPT, hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	6	Lab manual, charts, Handouts, experimental trainer instruments /kit with measuring instruments, computer with relevant simulation software and high speed internet	

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SCHEME OF ASSESSMENT

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S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
LO-10	Practical test in laboratory	**Student will be asked to** (and/or): 1. Install and configure Web browser and OS firewall. 2. Install and configure client software of email (outlook, thunderbird). 3. Install and configure telnet (dos, putty etc.) and ftp (FileZilla).	15	Question paper , Rating scale.	External

<div align="center">

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

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RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. 4
		E	0	3	5	0	1	4	11	

COURSE NAME	Data and Computer Networking
CO Description	Manage computer network and host websites.
LO Description	Manage and control LAN /Ethernet network

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-11	Perform Network monitoring and management functions like- Bandwidth management, Packet management, URL and content filtering, AAA (authentication authorization and accounting) and Antivirus using software i.e wireshark, spiceworks, etc.	Lab demonstration, PPT, hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. Student will conduct lab assignment based on these experiments.	--	8	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-11	Practical test in laboratory	**Student will be asked to**(and/or): 1. Perform Network monitoring and management functions like- Bandwidth management, Packet management, URL and content filtering using wireshark, spiceworks, etc. 2. Install and configure antivirus.	15	Question paper , Rating scale.	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	*0*	*3*	*5*	*0 1*	*4*	*12*	

COURSE NAME	**Data and Computer Networking**
CO Description	Manage computer network and host websites.
LO Description	Develop and host website.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-12	Create web pages using Content Management System (eg. Joomla, Drupal, Wordpress). Domain name registration and web hosting Process.	Lab demonstration, PPT, hands on practice, lab assignments.	• Teacher will explain the content in class/lab. • Teacher with support from lab staff will demonstrate the procedure of lab experiments. • Student will conduct lab assignment based on these experiments.	--	8	Lab manual, charts, Handouts, experimental trainer instruments/kit with measuring instruments, computer with relevant simulation software and high speed internet.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

		Student will be asked to			
LO-12	Practical test in laboratory	1. Create web pages using Content Management System (eg. Joomla, Drupal, Wordpress). 2. Perform Domain name registration and web hosting.	10	Rubrics, Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	**SCHEME FOR LEARNING OUTCOME**	Branch Code		Course Code			CO Code	LO Code	Format No. **4**
		E	**0**	**3**	**5**	**0**	**1**	**5**	
								13	

COURSE NAME	**Data and Computer Networking**
CO Description	Identify current and future computer network technologies.
LO Description	Compare architecture of current computer network technologies.

SCHEME OF STUDY	

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-13	Introduction, architecture and application of different Computer Networks technologies: Bluetooth, Wi-Fi, USB, DSL,FTTH.	Interactive classroom lecture, PPT, Video, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture-NPTEL and others.	

SCHEME OF ASSESSMENT	

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

| LO-13 | Question Paper -External- End Sem Exam | Student will be asked to(and/or):
1. Differentiate between Bluetooth,USB, WiFi network.
2. Describe different Computer Networks technologies: Bluetooth, Wi-Fi, USB, DSL,FTTH. | 10 | Question paper , Rating scale. | External |

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code		CO Code	LO Code	Format No. **4**
		E	**0**	**3**	**5**	**0**	**1**	**5**	
							5	**14**	

COURSE NAME	**Data and Computer Networking**
CO Description	Identify current and future computer network technologies.
LO Description	Define upcoming data technologies.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
LO-14	Cloud: definition, architecture and services; Introduction of Artificial Intelligence, Machine learning, Block chain and Data Mining	Interactive classroom lecture, PPT, Video, demonstration, quiz, Seminar	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	--	Text Books, PPT, Handouts, chalk board, charts, Video lecture- NPTEL and others.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

LO-14	Internal- Assignment /Progressive	Student will be asked to (and/or): 1. Define architecture and services of Cloud. 2. Define Machine Learning. 3. Define Data mining. 4. Define Block chain.	10	Question paper , Rating scale.	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					