GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	**:**	**DIPLOMA IN INFORMATION TECHNOLOGY**
LEVEL NAME	**:**	**PROFESSIONAL COURSES**
COURSE CODE	**:**	**IT403E$**
COURSE TITLE	**:**	**LINUX PROGRAMMING**
PREREQUISITE	**:**	**CM404E**
TEACHING SCHEME	**:**	**TH: 03; TU: 00; PR: 04(CLOCK HRs.)**
TOTAL CREDITS	**:**	**05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)**
TH. TEE	**:**	**03 Hrs.**
PR. TEE	**:**	**02 HRs (External)**
PT.	**:**	**01 Hr.**

❖ RATIONALE:

Operating System is most essential component of Computer System. Linux became the platform to run desktops, servers, and embedded systems across the globe, it was one of the most reliable, secure, and efficient operating systems available. The course aim is to provide in depth knowledge of this platform.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Access and manipulate the operating system parameters.
2. Apply services of Linux Operating system for implementing various types of applications.
3. Analyze Linux file system by accessing file and directory attributes.
4. Install and Operate Linux Operating System.
5. Develop programs using shell programming.
6. Execute various commands of Linux Operating System.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Introduction	1. Install Linux O.S. 2. Log in/out via terminals and network 3. Differentiate between Linux O.S. and Unix O.S. 4. State the features of Linux O.S. 5. State the steps to Create users and perform log-in and log-out via terminal and network.	1.1 History of Linux, Advantages of using Linux, Linux distribution, Linux kernel 1.2 The tools & Application, GNU/GPL license, Free software foundation, MULTICS 1.3 Unix kernel, The shell, The init process, special configuration in /etc/inittab file 1.4 Logging in and out: Logins via terminals, logins via network.	**10**
2. Linux Commands and Linux file system	1. Define SYSV init process 2. Describe Linux boot loaders: GRUB & LILO. 3. State the syntax and example of Various Linux commands. 4. Draw Ext 2 and Ext 3 linux file system structure. 5. Describe the other file system –ufs, JFS file system. 6. Describe Init run levels. 7. Apply Linux commands to manipulate file and directory attributes.	2.1 Internal & external commands in Linux: Internal commands in Linux echo, type, etc., External commands in Linux, ls, mv, rm, cat, useradd etc 2.2 Command line commands – who, log name, banner, cal, date, bc, man, info etc. 2.3 Files & directory commands – cat, less, more, ls, comm, diff, tar,Directory related commands – pwd, cd, mkdir, rmdir, Manipulating file commands - cp, mv, rm 2.4 File link commands chmod, umask, file, type, wc, split, cmp, diff. 2.5 Linux file system structure- ext 2, ext 3 file system 2.6 other file system – ufs, reiserfs, IBM, JFS file system 2.7 Linux boot loader – GRUB & LILO, 2.8 SYSV init process, Init Run Levels.	**10**
3. Introduction to Shell programming	1. Define Shell. 2. Develop programs using Vi editor. 3. Write Shell programs in vi editor. 4. List the steps to execute shell programs in vi editor.	3.1 Shell programming – Shell scripts, executing shell scripts, creating shell scripts. 3.2 Vi Editor: Appending files into current file, Changing Text commands, Cursor Positioning Commands, Cutting and Pasting Text, Exiting from vi, Text Deletion Commands, Text	**06**

		Insertion Commands, Undo Commands.	
4.Managing User accounts and Disk space	1. Apply different attributes of SUDO command to perform various administrative tasks. 2. Apply UPG tool to create user groups and assign privileges. 3. Describe RAID Technology 4. Define Shadow password file. 5.Compare KDE and GNOME desktop environment	4.1 The Root Account, Feature of Sudo, User Private Group (UPG), The shadow password file. 4.2 Metadevices, Logical volume manager, RAID technology supported under Linux 4.3 Job scheduling system-cron and at 4.4 The X Window System, Graphical User Interfaces: KDE and GNOME Desktop Environment.	**08**
5. Linux system security	1.Define Boot Security 2. Describe Security Principles. 3. Define PAM. 4. Describe SSL transaction. 5. Compare Host based security and network based security. 6.Apply PAM tool to access and grant different types of permissions to the files	5.1Types of Permissions, Security Principles- host based security & Network based security 5.2 Boot security, Firewall concept 5.3 PAM(Pluggable Authentication Modules), Advantages of PAM 5.4 Symmetric certificate in an SSL (Secure Socket Layer) transaction	**06**
6. Servers and services	1. Compare Apache server, NFS Server, NIS Server. 2. Describe working of DHCP Protocol. 3. Compare POP3 and SMTP. 4. Describe Intra-net services in Linux like telnet, rsh, ssh etc. 5. Apply DHCP protocol to allocate IP addresses to the host of the network in linux. 6. Define TCP-Wrapper. 7. Define FTP.	6.1 DNS (Domain Name System), MailTransfer Agent & Local Directory Agent, understanding pop3 & SMTP 6.2 Apache server (HTTP), feature of Apache, Working of web server Samba server, Advantage of Samba server, NFS server & its usage NIS server 6.3Working of DHCP & benefits of DHCP deployment 6.4ssh, Telnet, FTP, rsh xinetd, tcp-wrappers.	**08**
		Total Hrs.	**48**

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Install Linux OS on standalone machine.	Introduction	04
2.	Perform Logging/logout via terminals and network.		04
3.	Perform general purpose utility commands in Linux.	Linux Commands and Linux file system	06
4.	Use GRUB.CONF file to access and change system parameters while OS loading.		04
5.	Use VI Editor.	Introduction to Shell programming	02
6.	Write any two Shell script program in VI Editor.		04
7.	Write any two C program in VI Editor.		04
8.	Create User.	Managing User accounts and Disk space	02
9.	Recover Root Password.		04
10.	Run SUDO command to access system privileges.		04
11.	Configure firewall for computer security.	Linux system security	04
12.	Setup LAN: LAN topology and networking (TCP/IP statically using setup command or through wizard).		04
13.	Configure DHCP server.		04
14.	Perform rpm command to install any two packages.	Servers and services	04
15.	Access Net configuration of machine using netconfig command.		02
16.	Configure NFS server.		04
		Skill Assessment	04
		Total	**64**

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction	04(04)	04(04)	06(00)	**14(08)**
02	Linux Commands and Linux file system	04(00)	04(08)	06(00)	**14(08)**
03	Introduction to Shell programming	00(02)	04(04)	06(00)	**10(06)**
04	Managing User accounts and Disk space	00(02)	06(04)	06(00)	**12(06)**
05	Linux system security	04(00)	04(00)	00(06)	**08(06)**
06	Servers and services	02(00)	10(00)	00(06)	**12(06)**
	Total	**14(08)**	**32(20)**	**24 (12)**	**70 (40)**

R – Remember U – Understand A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	4	U	2	6	U	2	6	R	2	3	R	2	**5/7**
	4	R	2																
02	2	R	4	1	U	4	2	U	4	2	U	4	2	U	4				**3/5**
03	3	U	4	4	U	4	5	R	4	1	R	4	1	U	4				**3/5**
04	5	U	4	6	U	4	6	U	4	3	U	4	4	R	4				**3/5**
05	1	A	6	2	A	6	5	A	6										**2/3**
06	3	A	6	4	A	6	6	A	6										**2/3**

T= Unit/Topic Number L= Level of Question M= Marks

R-Remember U-Understand A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	**CA** (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**70**	**28**	Theory Answer Sheets	1, 2, 3
				Total	**100**	**40**		
Direct Assessment Practical	**CA** (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	**25**	**10**		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**50**	**20**	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION:

S.N.	Description	Max. Marks
1	Activities: Writing syntax of commands ,Writing procedure step by step ,Writing programs	10
2	Performance	20
3	Output of program , Result after executing commands	10
4	Viva voce	10
	TOTAL	**50**

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	-	-	-	-	-
2	-	3	3	3	-	-	-	-	-	-	3	-
3	-	3	3	3	-	-	-	-	-	-	-	-
4	-	3	3	3	1	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	-	2
6	-	3	3	3	-	-	-	3	3	3	3	2

1. Slight (Low) 2.Moderate (Medium) 3.Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Linux Command Line and Shell Scripting Bible	Richard Blum,Christine Bresnahan,3rd Edition,John Wiley & Sons ,Inc.,Jan 2015.	13: 9781118983843
2.	The Linux Command Line: A Complete Introduction	William E. Shotts Jr., 1st Edition,2012.	13: 9781118983843
3.	Linux: The Beginners Choice For the Linux System	Simon Bedford, CreateSpace Independent Publishing, April 13, 2015.	13:9781514895658

❖ E-REFERENCES:

- **http://www.slideshare.net/vignesh0009/linux-practicals , assessed on 02/09/2016.**
- **https://www.linux.com/tutorials , assessed on 02/09/2016.**

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. Computer (Dual Core or above)
2. Network printer.
3. Red Hat Enterprise Linux 6

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Dr.A.R.Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
2.	Mrs.D.P.Chanmanwar	Lect. In IT	Government Polytechnic, Nagpur.
3.	Mr.R.L.Meshram	Lect. In IT	Government Polytechnic, Nagpur.
4.	Ms.I.G.Lokhande	Lect. In IT	Government Polytechnic, Nagpur.
5.	Mr. Atul Upadhya	CEO	Vista Computers , Ram Nagar, Nagpur
6.	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
7.	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS) **(Chairman PBOS)**