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: *

THEORY: A.

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
2. Linux Commands and Linux file system	 Install Linux O.S. Log in/out via terminals and network Differentiate between Linux O.S. and Unix O.S. State the features of Linux O.S. State the steps to Create users and perform log-in and log-out via terminal and network. Define SYSV init process Describe Linux boot loaders: GRUB & LILO. State the syntax and example of Various Linux commands. Draw Ext 2 and Ext 3 linux file system structure. Describe the other file system. Describe Init run levels. Apply Linux commands to manipulate file and directory attributes. 	 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. 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 	10
3. Introduction to Shell programming	 Define Shell. Develop programs using Vi editor. Write Shell programs in vi editor. List the steps to execute shell programs in vi editor. 	Levels. 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	 Apply different attributes of SUDO command to perform various administrative tasks. Apply UPG tool to create user groups and assign privileges. Describe RAID Technology Define Shadow password file. 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	 Define Boot Security Describe Security Principles. Define PAM. Describe SSL transaction. Compare Host based security and network based security. 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	 Compare Apache server, NFS Server, NIS Server. Describe working of DHCP Protocol. Compare POP3 and SMTP. Describe Intra-net services in Linux like telnet, rsh, ssh etc. Apply DHCP protocol to allocate IP addresses to the host of the network in linux. Define TCP-Wrapper. 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:

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

SPECIFICATION TABLE FOR THEORY PAPER:

Unit	Units	Levels from Cognition Process Dimension							
No.		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(<mark>04</mark>)	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(<mark>00</mark>)	00(<mark>06</mark>)	12(06)				
	Total	14(<mark>08</mark>)	32(<mark>20</mark>)	24 (12)	70 (40)				

R – Remember U – Understand A – Analyze / Apply

***** QUESTION PAPER PROFILE FOR THEORY PAPER:

Q.		Bit 1	l.		Bit 2		1	Bit 3	3		Bit 4	4 /	5	Bit 5	;		Bit 6	5	autian
No	Т	L	M	Т	L	M	T	L	M	Т	L	M	Т	L	M	T	L	M	option
01	1	R	2	1	R	2	4	U	2	6	U	2	6	R	2	3	R	2	5/7
01	4	R	2						Name										3//
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	Α	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:

	1	Vhat	To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
ory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20		Test Answer Sheets	1, 2, 3
Direct Assessment Theory	C (Conti Assess	Assignments	Stud	Continuous	10		Assignment Book / Sheet	1, 2, 3
Direct Asse	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
	essment)	Skill Assessment		Continuous	20		Rubrics & Assessment Sheets	4,5,6
Direct Assessment Practical	CA (Continuous Assessment)	Journal Writing	Students	Continuous	05		Journal	4,5,6
ssessme	(Cor			TOTAL	25	10		
Direct As	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
ssessment	Student Feedback on course		Ct.,	After First Progressive Test	Stud	lent Feedba	ack Form	122456
Indirect Assessment	End (Of Course	Students End Of The Course Questionna		aires	1, 2, 3, 4,5,6		

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		Program Outcomes (POs)										PSOs	
Outcomes	1	2	3	4	5	6	7	8	9	10	1	2	
1	-	3	3	3	. /	7	-	-	-	-	7-1	-	
2	-	3	3	3	7		1	1	(=)	-	3	-	
3	-	3	3	3	-	17	-	2	=	-	-	-	
4	-	3	3	3	-15	PA		3	3	3	3	-	
5	-	3	3	3	in.	4	7	3	3	3	-	2	
6	-	3	3	3	六	K	1	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
	Linux Command Line and	Richard Blum, Christine Bresnahan, 3 rd	13: 9781118983843
1.	Shell Scripting Bible	Edition, John Wiley & Sons , Inc., Jan	
	1 0	2015.	
	The Linux Command Line:	William E. Shotts Jr., 1 st	13: 9781118983843
2.	A Complete Introduction	Edition,2012.	
	Linux: The Beginners Choice	Simon Bedford, CreateSpace	13:9781514895658
3.	For the Linux System	Independent Publishing, April 13,	
		2015.	

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	Government Polytechnic,
1.		Technology	Nagpur.
2.	Mr. S. P. Lambhade	Head of Department in	Govt. Polytechnic, Nagpur
۷.		Computer Engineering	
2.	Mrs.D.P.Chanmanwar	Lect. In IT	Government Polytechnic,
۷.			Nagpur.
3.	Mr.R.L.Meshram	Lect. In IT	Government Polytechnic,
٥.			Nagpur.
4.	Ms.I.G.Lokhande	Lect. In IT	Government Polytechnic,
4.		and the second second	Nagpur.
5.	Mr. Atul Upadhya	CEO	Vista Computers, Ram Nagar,
J.	10		Nagpur
6.	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri,
0.	and the second		Nagpur
7.	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic,
/.			Nagpur

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(Member Secretary PBOS)		(Chairman PBOS)