MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of BCA
(Effective for 2020-2021 Admission Session)
Choice Based Credit System

Name of the Course: BCA **Subject: Unix and Shell Programming**			
Course Code: BCAC601 and BCAC691		**Semester: 6**	
Duration: 48 Hrs.		**Maximum Marks:** 100 + 100	
Teaching Scheme		**Examination Scheme**	
Theory: 4		End Semester Exam:70	
Tutorial: 0		Attendance: 5	
Practical: 4		Continuous Assessment: 25	
Credit: 4+2		Practical Sessional internal continuous evaluation: 40	
		Practical Sessional external examination: 60	
Aim:			
Sl. No.			
1.	The aim is to make students aware of multi user operating system environment		
2.	The aim is to make students get familiar with CUI based command and Editors		
3.	The aim is to make student get familiar with Shell programming		
Objective:			
Sl. No.			
1	Students should develop an understanding of CUI commands and multi user environment		
2	Students should develop an understanding of files, attributes, process, and filters.		
3	Students should develop an understanding of Shell programming, system administrative commands.		
Pre-Requisite:			
Sl. No.			
1.	Knowledge of operating the computer system		
2.	NA		
Contents			
Chapter	**Name of the Topic**	**Hours**	**Marks**
01	**Introduction to UNIX** UNIX operating system, UNIX architecture: Kernel and Shell, Files and Processes, System calls, Features of UNIX, POSIX and single user specification, Internal and external commands **Utilities of UNIX** Calendar (cal), Display system date (date), Message display (echo), Calculator (bc), Password changing (password), Knowing who are logged in (who), System information using uname, File name of terminal connected to the standard input (tty)	**5**	**5**

02	**UNIX file system** File system, Types of file, File naming convention, Parent – Child relationship, HOME variable, inode number, Absolute pathname, Relative pathname, Significance of dot (.) and dotdot (..), Displaying pathname of the current directory (pwd), Changing the current directory (cd), Make directory (mkdir), Remove directories (rmdir), Listing contents of directory (ls), Very brief idea about important file systems of UNIX: /bin, /usr/bin, /sbin, /usr/sbin, /etc, /dev, /lib, /usr/lib, /usr/include, /usr/share/man, /temp, /var, /home	**5**	**10**
03	**Ordinary file handling** Displaying and creating files (cat), Copying a file (cp), Deleting a file (rm), Renaming/ moving a file (mv), Paging output (more), Printing a file (lp), Knowing file type (file), Line, word and character counting (wc), Comparing files (cmp), Finding common between two files (comm), Displaying file differences (diff), Creating archive file (tar), Compress file (gzip), Uncompress file (gunzip), Archive file (zip), Extract compress file (unzip), Brief idea about effect of cp, rm and mv command on directory	**5**	**10**
04	**File attributes** File and directory attributes listing and very brief idea about the attributes, File ownership, File permissions, Changing file permissions – relative permission & absolute permission, Changing file ownership, Changing group ownership, File system and inodes, Hard link, Soft link, Significance of file attribute for directory, Default permissions of file and directory and using umask, Listing of modification and access time, Time stamp changing (touch), File locating (find)	**5**	**10**
05	**Shell** Interpretive cycle of shell, Types of shell, Pattern matching, Escaping, Quoting, Redirection, Standard input, Standard output, Standard error, /dev/null and /dev/tty, Pipe, tee, Command substitution, Shell variables **Process** Basic idea about UNIX process, Display process attributes (ps), Display System processes, Process creation cycle, Shell creation steps (init -> getty -> login -> shell), Process state, Zombie state, Background jobs (& operator, nohup command), Reduce priority (nice), Using signals to kill process, Sending job to background (bg) and foreground (fg), Listing jobs (jobs), Suspend job, Kill a job, Execute at specified time (at and batch)	**5**	**10**
06	**Customization**	**5**	**10**

	Use of environment variables, Some common environment variables (HOME, PATH, LOGNAME, USER, TERM, PWD, PS1, PS2), Aliases, Brief idea of command history **Filters** Prepare file for printing (pr), Custom display of file using head and tail, Vertical division of file (cut), Paste files (paste), Sort file (sort), Finding repetition and non-repetition (uniq), Manipulating characters using tr, Searching pattern using grep, Brief idea of using Basic Regular Expression (BRE), Extended Regular Expression (ERE), and egrep, grep –E		
07	**Introduction to shell script** Simple shell scripts, Interactive shell script, Using command line arguments, Logical operator (&&, ||), Condition checking (if, case), Expression evaluation (test, []), Computation (expr), Using expr for strings, Loop (while, for), Use of positional parameters **System Administration** Essential duties of UNIX system administrator, Starting and shutdown, Brief idea about user account management (username, password, home directory, group id, disk quota, terminal etc.)	**10**	**15**
	Sub Total:	**44**	**70**
	Internal Assessment Examination & Preparation of Semester Examination	**4**	**30**
	Total:	**48**	**100**

Practical: (Unix and Shell Programming Lab)

Skills to be developed:

Intellectual skills:

4. Skill to work on different unix/linux based commands.
5. Knowledge of advanced administrative command and perform intermediate level shell programming.

List of Practical:

1. Calendar, Display system date, Message display, Calculator, Password changing, Knowing who are logged in, Knowing System information

2. Displaying pathname of the current directory (pwd), Changing the current directory (cd), Make directory
(mkdir), Remove directories (rmdir), Listing contents of directory (ls and its options), Absolute pathname, Relative pathname, Using dot (.) and dotdot (..)

6. Displaying and creating files, Copying a file, Deleting a file, Renaming/ moving a file, Paging output, Knowing file type, Line, word and character counting (wc), Comparing files, Finding common between two files, Displaying file differences
7. File and directory attributes listing, File ownership, File permissions, Changing file permissions – relative permission &absolute permission, Changing file ownership, Changing group ownership, File system and inodes, Hard link, Soft link, Default permissions of file and directory and using umask, Listing of modification and access time, Time stamp changing, File locating

8. Types of shell, Pattern matching, Escaping, Quoting, Redirection, Pipe, tee, Command substitution, Shell variables
9. Display process attributes, Display System processes, Background jobs, Reduce priority, Sending job to background and foreground, Listing jobs
10. Prepare file for printing, Custom display of file using head and tail, Vertical division of file, Paste files, Sort file, Finding repetition and non- repetition, Manipulating characters using, Searching pattern
11. Introduction to VI/VIM editor, Different commands of the editor, File editing in the editor
12. Simple shell scripts, Interactive shell script, Using command line arguments, Logical operator (&&, ||), Condition checking (if-then, if-then-else-fi, if-then—elif-else-fi, case), Expression evaluation (test, []), Computation (expr), Using expr for strings, Loop (while, for, until, continue), Use of positional parameters
13. Simple implementation of basic LINUX commands, utilities, filters etc. using shell scripts

Assignments:

Based on the curriculum as covered by the subject teacher.

List of Books

Text Books:

Name of Author	**Title of the Book**	**Edition/ISSN/ISBN**	**Name of the Publisher**
Sumitava Das	UNIX-Concepts & Applications		TMH
Peek	Learning UNIX Operating System		SPD/O'REILLY
Reference Books:			
Srirengan	Understanding UNIX		PHI

List of equipment/apparatus for laboratory experiments:	
Sl. No.	
1.	Computer with moderate configuration
2.	Unix/Linux OS and other softwares as required.

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	**Unit**	**Objective Questions** (MCQ only with the correct answer)		**Subjective Questions**			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	**1 to 9**	**10**	**10**	**5**	**3**	**5**	**60**

B **C**	**1 to 9** **1 to 9**			**5**	**3**	**15**	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	**Chapter**	**Marks of each question**	**Question to be set**	**Question to be answered**
A	All	1	10	10
B	All	5	5	3
C	All	15	5	3

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Continuous evaluation			**40**

External Examination: Examiner-

Signed Lab Note Book	**10**	
On Spot Experiment	**40**	
Viva voce	**10**	**60**