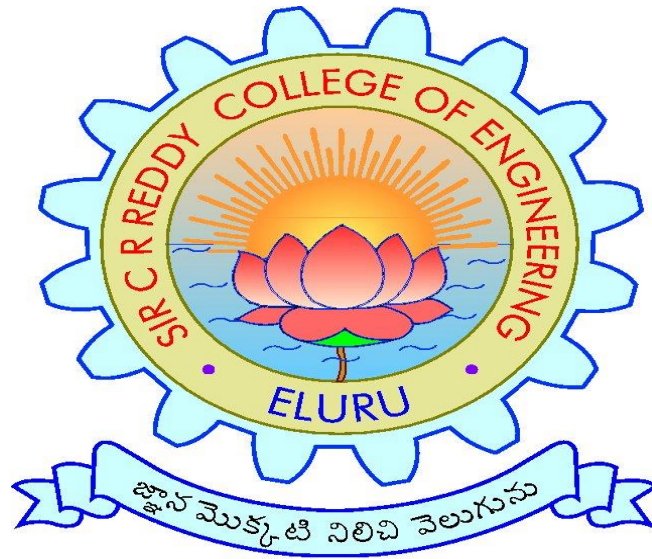**SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU**

DEPARTMENT OF INFORMATION TECHNOLOGY

LESSON PLAN

SUBJECT: Unix and Shell Programming

CLASS: 3/4 B.Tech., I SEMESTER, A.Y.2019-20

INSTRUCTOR: SRI K.LAKSHMAJI

Sir C R Reddy College of Engineering
DEPT. OF INFORMATION TECHNOLOGY

Course Description:

      To acquaint the students with the basic internal structure & operations of UNIX operating system, able to develop system programs using system calls and to introduce utilities & Shell Programming.

Course Objectives:
- To provide introduction to UNIX Operating System and its File System
- To gain an understanding of important aspects related to the SHELL and the process
- To develop the ability to formulate regular expressions and use them for pattern matching.
- To provide a comprehensive introduction to SHELL programming, services and utilities.

RT22052	U N I X S h ell programming	
Instruction: 4 Periods + 1 Tut/week, Univ. Exam: 3 Hours		**Credits: 3**
Internal: 30 Marks	**University Exam: 70 Marks**	**Total: 100 Marks**

Syllabus

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command:Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-VI
The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control.

Course Outcomes:

- Describe the architecture and features of UNIX Operating System and distinguish it from other Operating System
- Demonstrate UNIX commands for file handling and process control
- Write Regular expressions for pattern matching and apply them to various filters for a specific task
- Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem

TEXT BOOKS:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.
2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

REFERENCE BOOKS:

Unix and shell programmingby B.M. Harwani, OXFORD university press.

Prerequisite

Student must know at least the basics of how to use a computer, and should be able to start a command line shell and Operating System. If you are new to programming then Introduction to Programming is strongly recommended. If you already know C,java and python unix should be easy to pick up.

Internal Assessment Details:

Internal Test 1& 2: 15Marks

Assignment-1& 2: 5Marks

Online-1&2:10M

Total: 30 Marks

ONLINE REFERENCES:

1. https://www.geeksforgeeks.org/introduction-linux-shell-shell-scripting/

2. https://www.tutorialspoint.com/unix/shell_scripting.htm

3. https://www.shellscript.sh/first.html

SIR C R REDDY COLLEGE OF ENGINEERING :: ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE SCHEDULE

Unit No	Description of the Chapter	Description of the Topics	Total no of periods (L+T)
1	Introduction to unix	Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.	8+2
2	The File system	The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.	8+2
3	Using Shell	Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.	8+2
4	Filters	Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.	8+2
5	Shell Programming	Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The	11+5

| | | Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command:Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command. | |
| 6 | Process | The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control. | 8+2 |

Total no of instructional periods available for the course   :   75 periods

Total no of estimated periods   :   66 periods

Signature of the H.O.D   **Signature of the Faculty**

                                                             Date:

	LECTURE PLAN
DEPARTMET	INFORMATION TECHNOLOGY
NAME OF LECTURER's	K.LAKSHMAJI

Expected (Planed) date of completion of the course:
Unit Number: 1 29th June 2019
Unit Number: 2 13th July 2019
Unit Number: 3 27th July 2019
Unit Number: 4 24th August 2019
Unit Number: 5 23rd September 2019
Unit Number: 6 5th October 2019

Sl.No	Topics to be covered	No. of Lecture hours	Teaching method	Text book	CO
	UNIT-1				
1	Introduction to unix—Brief History	2	BB	T2[1-4]	
2	What is Unix—Unix, Components , Using Unix	2	BB, PPT with LCD	T2[5-11]	
3	Commands in Unix—Some Basic Commands	4	BB, PPT with LCD	T2[12-27]	
4	Command Substitution	1	BB	T2[28-29]	
5	Giving Multiple Commands	1	BB	T2[30-31]	
Actual date of completion: Remarks:					
	UNIT-2				
6	The File system ,The Basics of Files, What's in a File	1	BB	T1[41-47]	
7	Directories and File Names ,Permissions	2	BB, PPT with LCD	T1[48-56]	

8	INodes	1	BB	T1[57-62]	
9	The Directory Hierarchy	1	BB	T1[63-64]	
10	File Attributes and Permissions	2	BB, PPT with LCD	T2[71-79]	
11	The File Command knowing the File Type	**1**	BB	T2[80]	
12	The Chown Command Changing the Owner of a File	**1**	BB	T2[84]	
13	The Chgrp Command Changing the Group of a File	**1**	BB	T2[85]	

Actual date of completion:

Remarks:

UNIT-3					
14	Using shell-Command Line Structure	2	BB	T1[71-73]	
15	Met characters	2	PPT with LCD	T1[74-79]	
16	Creating New Commands	1	BB	T1[80-81]	
17	Command Arguments and Parameters	1	BB	T1[82-85]	
18	Program Output as Arguments	1	BB	T1[86-87]	
19	Shell Variables	1	BB	T1[88-91]	
20	More on I/O Redirection	1	BB	T1[92-93]	
21	Looping in Shell Programs	1	BB	T1[94-96]	

Actual date of completion:

Remarks:

UNIT-4					

22	Filters-The Grep Family	2	BB	T1[101-105]	
23	Other Filters	1	BB	T1[106-107]	
24	The Stream Editor Sed	3	BB, PPT with LCD	T1[108-113]	
25	The AWK Pattern Scanning and processing Language	3	BB, PPT with LCD	T1[114-129]	
26	Good Files and Good Filters	1	BB	T1[130-132]	

Actual date of completion:

Remarks:

	UNIT-5				
27	Shell Programming-Shell Variables	1	BB	T2[197-201]	
28	The Export Command	1	PPT with LCD	T2[202]	
29	The Profile File a Script Run During Starting	1	BB	T2[203]	
30	The First Shell Script-The read Command	2	BB, PPT with LCD	T2[204-208]	
31	Positional parameters	1	BB	T2[209-212]	
32	The $? Variable knowing the exit Status	1	BB	T2[213]	
33	More about the Set Command-The Exit Command	2	BB	T2[214-217]	
34	Branching Control Structures-Loop Control Structures-The Continue and Break Statement	3	BB, PPT with LCD	T2[218-226]	
35	The Expr Command:Performing Integer Arithmetic-Real Arithmetic in Shell Programs	2	BB, PPT with LCD	T2[227-229]	

36	The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command	2	BB, PPT with LCD	T2[230-235]	

Actual date of completion:

Remarks:

	UNIT-6				
37	The Process—The Meaning— Parent and Child Processes	2	BB	T2[172-173]	
38	Types of Processes	1	BB	T2[174]	
39	More about Foreground and Background processes	1	BB	T2[175]	
40	Internal and External Commands	1	PPT with LCD	T2[176-177]	
41	Process Creation	1	BB	T2[178-179]	
42	The Trap Command	1	PPT with LCD	T2[182-183]	
43	The Stty Command	1	BB	T2[184]	
44	The Kill Command	1	BB	T2[185]	
45	Job Control	1	BB	T2[186]	

Actual date of completion:

Remarks:

	Total classes	66			

Actual syllabus completion:

Faculty Remarks:

HoD Remarks:

Unix & Shell Programming
Unit Wise Question Bank

Unit-1
Short Questions:
1. What is a System call in UNIX? [2M]
2. Difference between a System call and UNIX command. [3M]
3. List the Features of UNIX operating system. [3M]
4. How Unix is different from other Operating Systems?
Long Questions:
1. What is UNIX? List out various versions of UNIX? [4M]
2. Discuss the role of kernel in operating system. [4M]
3. With a neat sketch, explain the directory structure of UNIX operating system. [4M]
4. With a neat sketch, explain the architecture of UNIX operating system. [7M]
5. Explain the following UNIX commands i) mkdir ii) rm iii) tar iv) cat [7M]
6. Compare and contrast library function, system call and Unix command. [7M]
7. What is command substitution in a shell? Why is it important? Explain with an example. [7M]
8. What is UNIX operating system? Explain various components of UNIX operating system. [7M]
9. Is it possible to run multiple commands of UNIX in one time? Justify your answer with proper explanation. [7M]

Unit-2
Short Questions:
1. What types of files are used to represent physical devices in UNIX file system?[2M]
2. Which command will list the hidden files in UNIX?[2M]
3. List the Fields of an*inode* structure in UNIX file system.[3M]
4. Interpret the command **chmod 644[2M]**
Long Questions:

1. Explain the implementation details of UNIX file system. [7M]

2. Describe the attributes and permissions of a file in UNIX file system. [4M]
3. Which command is used to change the file permissions in UNIX? Explain with an example. [3M]
4. What is the *inode* in UNIX? Where are inodes stored in UNIX file system?Explain.[7M]
5. Explain the commands that are available in UNIX file system to change the permissions of a file. [7M]
6. What are Links and Symbolic links in UNIX file system? Explain. [7M]

7. Explain the **chown** and **chgrp** commands in UNIX with an example. [7M]
8. Discuss the UNIX file structure and directories. [7M]
9. Explain the format of **chmod** and **chown** commands in UNIX. [7M]

Unit-3
1. What is a Shell? Explain the two different duties of a Shell. How can you create a sub shell? How can you move to the parent shell after creating a sub shell?[7M]
2. What is Redirection? Explain the various commands used for redirection.[7M]
3. What is an Environment variable? List out the common environment variables that control the user environment in Shell.[7M]
4. Compare different loops used in Shell script [3M]
5. Write a shell script to get current date, time, user name and current working directory. [4M]
6. Is it possible to pipe output of a command as an argument to a shell script?Justify your answer.[7M]
8. Explain about various loop control statements of C shell with a sample example. [7M]
9. What are the advantages and disadvantages of Shell scripting? [5M]
10. Write a Shell Script to display result based on the value returned from a function call. [9M]

Unit-4
1. Define the **grep** family. Mention the primary difference between fgrep and the other two members of the grep family.[7M]
2. With a neat diagram, describe an awk utility's view of a file and also explain the file buffers and record buffers of awk.[7M]
3. What is **grep** command? Explain the operation of the grep command with a neat flowchart? And Illustrate the working of the grep command with a suitable example.[7M]
4. Explain in brief various categories of **awk** patterns. [7M]
5. Define the 'sed'utility? Give the format of the 'sed'and Explain the operation
of the 'sed'utility with suitable diagrams.[7M]
6. Explain the differences between grep and sed with a suitable example. [7M]
7. Compare the three utilities of the grep family with a clear explanation [7M]
8. List out the different string functions of **awk** utility and explain any three. [7M]

Unit-5
1. What is the use of 'eval' command in C shell and also explain the execution of
 'eval' command with suitable example.[7M]

2. Is it possible to pause the execution of a shell script for a specified time period?
Give explanation. [7M]
3. Explain the purpose of **set** command with an example. [7M]
4. Write a Shell script describing integer and real arithmetic [7M]
5. What are positional parameters? How a C shell script is invoked by passing parameters? Explain. [7M]
6. How we know the exit status of a command in C shell? Explain. [7M]
7. What are positional parameters in C shell scripting? Explain the meaning of the $0, $1, $2,${9}, $*, and $#. [7M]
8. List out the important uses of **exec** command in shell script. [3M]
9. Write shell scripts to illustrate the use of continue and **break** statements. [4M]

Unit-6
1. Illustrate the syntax of **trap** command. [7M]
2. Explain in sequence the steps to convert a background process to a foreground process. [7M]

3. What is a Child process? How it is created? Explain the relationship between

parent process and child process. [8M]
4. Explain the use of **stty** command along with its syntax. [6M]

5. Explain in detail about the internal and external commands in UNIX. [6M]
6. What happens to the child process when the parent process kills/dies first? Explain with an example. [8M]

7. Differentiate between Internal and External commands of UNIX. [9M]
8. Explain the importance of **kill** command in UNIX with examples. [6M]