J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

COURSE FILE
OF
LINUX PROGRAMMING

IV B.TECH (CSE)	I SEMESTER	ACADEMIC YEAR	2015-16

	COURSE PLAN	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant professor
Department:: Computer Science & Engineering

COURSE DETAILS

Name Of The Programme:: B.Tech Batch:: 2011
Designation:: IV-B.Tech
Year 2015-16 Semester I
Department:: Computer Science and Engineering
Title of The Subject Linux Programming Subject Code 6756032
No of Students

	COURSE PLAN	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUAR
Designation: Assistant Professor
Department:: Computer Science and Engineering

1. TARGET

a) Percentage Pass 100%

b) Percentage I class 95%

2. COURSE PLAN

(Please write how you intend to cover the contents: i.e., coverage of Units by lectures, guest lectures, design exercises, solving numerical problems, demonstration of models, model preparation, or by assignments, etc.)

a) Coverage of units by lectures
b) Design exercises
c) Assignments

3. METHOD OF EVALUATION

3.1. ☐ Continuous Assessment Examinations (CAE 1, CAE 2)

3.2. ☐ Assignments / Seminars

3.3. ☐ Mini Projects

3.4. ☐ Quiz

3.5. ☐ Term End Examination

3.6. ☐ Others

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

Signature of HOD
Date:

Signature of Faculty
Date:

	GUIDELINES TO STUDY THE SUBJECT	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty::	P.PREM KUMAR
Designation:	Assistant Professor
Department::	CSE
Guidelines for Preparing the Course:	

Course Description:
This programming course covers the major methods of inter process communications (IPC), which is the basis of all client / server applications under UNIX, Linux utilities. There will be extensive Programming exercises in shell scripts. It also emphasizes various concepts in IPC and multithreaded programming and socket programming.

Course Objectives:

1. To understand the usage of UNIX inter process communications (IPC).
2. To control the resources with various commands.
3. To understand File systems and File structures.
4. To provide support for distributed and networked applications in UNIX environment.
5. To understand the concepts of multithreaded programming and socket programming.
6. To study the detail concepts of low level file access
7. Can understand the client ,server programming
8. To know the basic concept of Linux scripting

Learning Outcomes:

Upon completion of this course, students will be able to:

1. Mastery of the basic UNIX process structure and the UNIX file system.
2. Understand all the UNIX utilities, and implement shell scripting.
3. Mastery of simple UNIX filters
4. Familiarity of UNIX pipes and redirection, UNIX environment, traps, signals, filter parameters, filter options, UNIX contentions, and Regular Expressions.
5. Mastery of at least one Shell scripting language.
6. Understand the concepts of process, threads, and file structure.
7. Familiarity with Interprocess Communication using pipes, shared memory, semaphores and messages.
8. Design various client server applications using TCP or UDP protocols.

	COURSE OBJECTIVES	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE

On completion of this Subject / Course the student shall be able to:

S.No.	Objectives	Outcomes
1.	To understand File systems and File structures.	1,2
2.	To control the resources with various commands	3
3.	To understand bash concepts	4,5
4.	To provide support for distributed and networked applications in UNIX environment.	4
5.	To know the basic concept of linux scripting	5
6.	Can koow the concept of POSICS thread API	6
7.	To study the detail concepts of low level file access	6
8.	To understand the usage of UNIX inter process communications (IPC).	7
9.	To understand the concepts of multithreaded programming and socket programming	8
10.	Can understand the client ,server programming	8

Signature of Faculty
Date:

Note: For each of the OBJECTIVE indicate the appropriate OUTCOMES to be achieved.
Kindly refer Page 16, to know the illustrative verbs that can be used to state the objectives.

	COURSE OUTCOMES	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE

The expected outcomes of the Course / Subject are:

S.No.	General Categories of Outcomes	Specific Outcomes of the Course
A.	An ability to apply knowledge of mathematics, science, and engineering	
B.	An ability to design and conduct experiments, as well as to analyze and interpret data	
C.	An ability to design a system, component, or process to meet desired needs within realistic Constraints such as economic, environmental, social, political, ethical, health and safety, Manufacturability and sustainability	
D.	An ability to function on multi-disciplinary teams	
E.	An ability to identify, formulate, and solve engineering problems	
F.	An understanding of professional and ethical responsibility	
G.	An ability to communicate effectively	
H.	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
I.	A recognition of the need for, and an ability to engage in life-long learning	
J.	A knowledge of contemporary issues	
K.	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Objectives – Outcome Relationship Matrix (Indicate the relationships by☒mark).

Outcomes / Objectives	A	B	C	D	E	F	G	H	I	J	K
1.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	COURSE SCHEDULE	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 76 hours(Linux Programming)

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	Linux Utilities			12
2.	Working with the Bourne again shell(bash)			9
3.	Linux Files			10
4.	Linux Process			9
5.	Linux Signals			9
6.	Interprocess Communication			11
7	Multithreaded Programming			9
8	Sockets			7

Total No. of Instructional periods available for the course: 76 Hours / Periods

	SCHEDULE OF INSTRUCTIONS UNIT - I	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 12

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		2	File handling utilities, Security by file permissions,	1 1	TB2(83-103)
2		1	Process utilities, Disk utilities	2 1	TB2(44-60)
3		1	Networking commands, Filters	2 2	TB2(61-71)
4		1	Text processing utilities, Backup utilities	2 2	TB2(73-82)
5		2	**Sed:** Scripts, Operation, Addresses	1,2 2	TB2(255-258)
6		1	Commands, Applications	2 2	TB2(259-260)
7		1	**Awk:** Execution,fields and records ,	2 2	TB2(381-384)
8		1	Scripts, operation,patterns,	2 2	TB2(385-392)
9		2	Actions, Functions, using system commands in awk	2 2	TB2(393-398)

TB2: Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - II	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 9

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal...) Page No___ to ___
1		1	Introduction: shell responsibilities, pipes	3 3	TB2(145-153,161-164)
2		1	input Redirection, output redirection	3 3	TB2(154-156)
3		1	here documents, running a shell script	3 3	TB2(157-158)
4		1	the shell as a programming language, shell meta characters	3 3	TB2(158-159)
5		1	file name substitution, shell variables command substitution	3 3	TB2(166-168)
6		1	shell commands, the environment quoting, test command	3 3	TB2(165-166)
7		1	control structures, arithmetic in shell shell script examples	3 3	TB2(148-151)
8		1	interrupt processing, functions	3 3	TB2(151-153)
9		1	debugging shell scripts	3 3	TB2(169-171)

TB2: Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - III	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 10

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	File Concept, File System structure, Inodes, File types	4 4	TB1(129-130)
2		1	The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets etc.)	4 4	TB1(134-138)
3		1	formatted I/O, stream errors, kernel support for files	4 4	TB1(139-141)
4		1	System calls library functions, file descriptors	4 4	TB1(142-143)
5		1	**low level file access :** usage of open, creat, read, write, close, lseek, stat family	4 4	TB1(131-132)
6		1	umask, dup, dup2, fcntl, file and record locking	4 4	TB1(132-133)
7		1	**file and directory management:** chmod, chown, links(soft links & hard links - unlink, link, symlink)	4 4	TB1(143-144)
8		1	mkdir, rmdir, chdir, getcwd	5 5	TB1(143-144)
9		1	**Scanning Directories:** opendir, readdir Closedir	5 5	TB1(144-145)
10		1	rewinddir, seekdir, telldir functions	5 5	TB1(145-146)

TB1: Unix System Programming using C++, T.Chan, PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
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MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - IV	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 9

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	Process concept	2 6	TB1(207-208)
2		1	Kernel support for process	2 6	TB1(208-210)
3		1	process attributes, process hierarchy	2 6	TB1(238-240)
4		1	process states,process composition	2 6	TB1(240-242)
5		1	**process control :** process creation	2 6	TB1(211-212)
6		1	waiting for a process,process termination	2 6	TB1(212-216)
7		1	zombie process,orphan process	2 6	TB1(216-218)
8		1	system call interface for process management-fork vfork, exit,	2 6	TB1(219-226)
9		1	wait, waitpid, exec family, system.	2 6	TB1(226-229)

TB1: Unix System Programming using C++, T.Chan, PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - V	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 9

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	Introduction to signals	2 4	TB1(259-260)
2		1	Signal generation and handling	2 4	TB1(260-261)
3		1	Kernel support for signals	2 4	TB1(261-262)
4		1	Signal function	2 4	TB1(263-265)
5		1	unreliable signals	2 4	TB1(265-266)
6		2	reliable signals	2 4	TB1(266-269)
7		1	kill, raise , alarm	2 4	TB1(274-275)
8		1	pause, abort, sleep functions	2 4	TB1(276-277)

TB1: Unix System Programming using C++, T.Chan, PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VI	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 11

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	Introduction to IPC, IPC between processes on a single computer system	1 7	TB1(292-293)
2		1	IPC between processes on different systems,	1 7	TB1(293-294)
3		1	Pipes and FIFOs	1 7	TB1(294-295)
4		1	**Introduction to three types of IPC(Linux)**-message queues, semaphores and shared memory.	1 7	TB1(295-296)
5		1	**Message Queues**- Kernel support for messages	1 7	TB1(297-306)
6		1	Linux APIs for messages, client/server example.	1 7	TB1(306-319)
7		1	**Semaphores:** Kernel support for semaphores	1 7	TB1(322-326)
8		1	Linux APIs for semaphores,	1 7	TB1(327-329)
9		1	file locking with semaphores.	1 7	TB1(329-332,173-177)
10		1	**Shared Memory:** Kernel support for shared memory	1 7	TB1(335-339)
11		1	Linux APIs for shared memory, semaphore and shared memory example.	1 7	TB1(339-343)

TB1: Unix System Programming using C++, T.Chan, PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VII	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 9

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	Differences between threads and processes	2,6 6	TB1(521-522)
2		1	Thread structure and uses	2,6 6	TB1(523-524)
3		1	Threads and Lightweight Processes	2,6 6	TB1(524-525)
4		1	POSIX Thread APIs	2,6 6	TB1(525-526)
5		1	Creating Threads	2,6 6	TB1(526-527)
6		1	Thread Attributes	2,6 6	TB1(528-529)
7		1	Thread Synchronization with semaphores	2,6 6	TB1(529-530)
8		1	Thread Synchronization with Mutexes	2,6 6	TB1(531-539)
9		1	Example programs	2,6 6	TB1(541-545)

TB1: Unix System Programming using C++, T.Chan, PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	SCHEDULE OF INSTRUCTIONS UNIT - VIII	2015-16 Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: 7

Sl. No.	Date	No. of Periods	Topics / Sub - Topics	Objectives & Outcome Nos.	References (Text Book, Journal…) Page No___ to ___
1		1	Introduction to Linux Sockets	7 8	TB1(367-371), TB3(67- 88)
2		2	Socket system calls for connection oriented protocol	7 8	TB1(372-379), TB3(95-117)
3		2	Socket system calls for connectionless protocol	7 8	TB1(379-389), TB3(239-245)
4		2	example-client/server programs	5,7 8	TB1(391-394)

TB1: Unix System Programming using C++, T.Chan, PHI.
TB3: Unix Network Programming ,W.R.Stevens,PHI.

Signature of Faculty
Date

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED **BOLDLY**.
MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

	COURSE COMPLETION STATUS	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR

Subject:: Linux Programming Subject Code 6756032

Department:: CSE

Actual Date of Completion & Remarks, if any

Units	Remarks	Nos. of Objectives Achieved
Unit 1		1
Unit 2		2
Unit 3		3
Unit 4		4
Unit 5		5
Unit 6		6
Unit 7		7
Unit 8		8

Signature of Dean of School
Date:

Signature of Faculty
Date:

NOTE: AFTER THE COMPLETION OF EACH UNIT MENTION THE NUMBER OF OBJECTIVES ACHIEVED.

	TUTORIAL SHEETS - I	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: Linux programming

Date:

This Tutorial corresponds to Unit Nos.I,II Time:

1. a) Explain the **grep** family of commands in detail with suitable examples?
   b) What is **awk script**? Explain different **Patterns** in awk?
   c) Write a **sed script** to print all the lines of a **file** that is passed as command line argument by changing the string **madras** with **chennai**?
2. a) What is **Shell script**? Explain **control structures** in shell?
   b) Write a short note on **I/O Redirection** operators.
   c) Write a shell script to display **files** which has read and write and execution permissions?

Objectivs: To control the resources with various commands.

Outcomes: Understand all the UNIX utilities, and implement shell scripting.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	TUTORIAL SHEETS - II	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE
The Schedule for the whole Course / Subject is:: Linux programming

Date:

This Tutorial corresponds to Unit Nos.III,IV,V

Time:

1. a) What is **File** ? Explain **File system structure** in Linux?
   b) Diffrentiate the following terms?
   i. **getc()** vs **fgetc()** ii. **stat()** vs **fstat()** iii. **printf()** vs **fprintf()** iv. **scanf()** vs **fscanf()**
2. a) what is **process** ?Explain kernel support for process?
   b) What is **system call**? Differentiate the following system calls?
   i. **fork()** and **vfork()** ii. **wait()** and **waitpid()**

3 a) Compare the IPC functionality provided by pipes and message queues. What are the advantages and drawbacks of each? Explain briefly?
   b) Explain about UNIX system V APIs for Messages?
   c) Write a program for creating a private message queue?

Objectives:
1.To control the resources with various commands.
2.To understand File systems and File structures.
3.To understand the usage of UNIX inter process communications (IPC)

Outcomes:
1. Understand the concepts of process, threads, and file structure.
2. Familiarity of UNIX pipes and redirection, UNIX environment, traps, signals, filter parameters, filter options, UNIX contentions, and Regular Expressions.
3.Understand the concepts of process, threads, and file structure.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	TUTORIAL SHEETS - III	2015-16
		Regulation: R12

FACULTY DETAILS:

Name of the Faculty:: P.PREM KUMAR
Designation: Assistant Professor
Department:: CSE

Date:

This Tutorial corresponds to Unit Nos. VI,VII,VIII Time:

1) a) Explain similarities and dissimilarities between the semaphore and shared memory IPC mechanisms?
   b) Explain the kernel data structure for shared memory with a neat diagram. Also explain the APIs associated for creating and destroying a shared memory?
   c) Write a program to demonstrate communication of two different processes via shared memory?
2) a) Write a program to create a thread with pthread-create?
   b) Explain the APIs used to specify the attributes for a thread?
   c) What are the benefits of using multithreaded programming?
3) a) Explain the sequence of steps to process various socket functions using TCP protocol?
   b) Explain about the structure of socket addresses?
   c) Explain a stream socket with a illustrative example for client/server program?

Object: To understand the concepts of multithreaded programming and socket programming.

Outcomes: Familiarity with Inter process Communication using pipes, shared memory, semaphores and messages.
Design various client server applications using TCP or UDP protocols.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the objectives to which these questions / Problems are related.

Signature of Dean of School
Date:

Signature of Faculty
Date:

	ILLUSTRATIVE VERBS FOR STATING INSTRUCTIONAL OBJECTIVES	2015-16 Regulation: R12

These verbs can also be used while framing questions for Continuous Assessment Examinations as well as for End – Semester (final) Examinations.

ILLUSTRATIVE VERBS FOR STATING **GENERAL OBJECTIVES**

Know Comprehend	Understand Apply	Analyze Design	Generate Evaluate

ILLUSTRATIVE VERBS FOR STATING **SPECIFIC OBJECTIVES:**

A. Cognitive Domain

1	2	3	4	5	6
Knowledge	**Comprehension Understanding**	**Application** of knowledge & comprehension	**Analysis** of whole w.r.t. its constituents	**Synthesis** combination of ideas/constituents	**Evaluation** judgement
Define	Convert	Change	Breakdown	Categorize	Appraise
Identify	Defend	Compute	Differentiate	Combine	Compare
Label	Describe (a	Demonstrate	Discriminate	Compile	Conclude
List	procedure)	Deduce	Distinguish	Compose	Contrast
Match	Distinguish	Manipulate	Separate	Create	Criticize
Reproduce	Estimate	Modify	Subdivide	Devise	Justify
Select	Explain why/how	Predict		Design	Interpret
State	Extend	Prepare		Generate	Support
	Generalize	Relate		Organize	
	Give examples	Show		Plan	
	Illustrate	Solve		Rearrange	
	Infer			Reconstruct	
	Summarize			Reorganize	
				Revise	

B. Affective Domain		**C. Psychomotor Domain (skill development)**				
Adhere	Resolve	Bend	Dissect	Insert	Perform	Straighten
Assist	Select	Calibrate	Draw	Keep	Prepare	Strengthen
Attend	Serve	Compress	Extend	Elongate	Remove	Time
Change	Share	Conduct	Feed	Limit	Replace	Transfer
Develop		Connect	File	Manipulate	Report	Type
Help		Convert	Grow	Move preciselyReset		Weigh
Influence		Decrease	Handle	Operate	Run	
Initiate		Demonstrate	Increase	Paint	Set	

	LESSON PLAN **Unit-1**	2015-16 Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit I

INSTRUCTIONAL OBJECTIVES: 12

Session No	Topics to be covered	Time	Ref	Teaching Method
1	File handling utilities, Security by file permissions,	50min	T1	Black Board
2	Process utilities, Disk utilities	50min	T1	Black Board
3,4	Networking commands, Filters	100min	T1	Black Board
5	Text processing utilities, Backup utilities	50min	T1	Black Board
6,7	**Sed:** Scripts, Operation, Addresses	100min	T1	Black Board
8	Commands, Applications	50min	T1	Black Board
9	**Awk:** Execution,fields and records ,	50min	T1	Black Board
10	Scripts, operation,patterns,	50min	T1	Black Board
11,12	Actions, Functions, using system commands in awk	100min	T1	Black Board

On completion of this lesson the student shall be able to(Outcomes)

1. Understand different file handling utilities and text processing utilities
2. Know how to write and execute sed and awk programs easily

	ASSIGNMENT **Unit-I**	2015-16 Regulation: R12

Assignment / Questions

1. Write a linux command to display the lines from 25 to 45 of /etc/passwd file.
   Write a linux command to display the directories in /etc 4
2. Consider that marks.txtis a file that contains one record per line (comma separated fields) of the student data in the form of studentid, student name, Telugu marks, English marks, Maths marks, Science marks, Social marks. Write an awk script to generate result for every student in the form of studentid, student name, Total marks and result. Result isPASS if marks is >= 30 in Telugu and English , and if marks >= 40 in other subjects. Result is FAIL otherwise.
3. Write briefly on sed, chmod, df, comm, fgrep and sort commands with examples.

Based upon the assignment student should be able to understand programming concept of sed scripts and also know the usage of chmod , df comm, and fgrep commands

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-II	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit II

INSTRUCTIONAL OBJECTIVES: 9

Session No	Topics to be covered	Time	Ref	Teaching Method
13	Introduction: shell responsibilities, pipes	50min	T1	Black Board
14	input Redirection, output redirection	50min	T1	Black Board
15	here documents, running a shell script	50min	T1	PPT
16	the shell as a programming language, shell meta characters	50min	T1	Black Board
17	file name substitution, shell variables command substitution	50min	T1	Black Board
18	shell commands, the environment quoting, test command	50min	T1	PPT
19,20	control structures, arithmetic in shell shell script examples	100min	T1	PPT
21	interrupt processing, functions	50min	T1	Black Board

On completion of this lesson the student shall be able to

Write and execute shell programs effectively.

	ASSIGNMENT **Unit-II**	2015-16
		Regulation: R12

Assignment / Questions

1. Write briefly on case control structure in bash with examples. Write briefly on "||" operator in bash.
2. Write in detail on the features of test command.
3. Write in detail on the command expansion feature provided in bash with examples

Objective and outcome of the assignment is should able to understood bash concept in UNIX

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-III	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit III

INSTRUCTIONAL OBJECTIVES: 10

Session No	Topics to be covered	Time	Ref	Teaching Method
22	File Concept, File System structure, Inodes, File types	50min	T1,RB1	Black Board
23	The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets etc.)	50min	T1	Black Board
24	formatted I/O, stream errors, kernel support for files	50min	T1	PPT
25	System calls library functions, file descriptors	50min	T1	Black Board
26	**low level file access :** usage of open, creat, read, write, close, lseek, stat family	50min	T1,RB1	Black Board
27	umask, dup, dup2, fcntl, file and record locking	50min	T1	PPT
28	**file and directory management:** chmod, chown, links(soft links & hard links - unlink, link, symlink)	50min	T1,RB1	Black Board
29	mkdir, rmdir, chdir, getcwd	50min	T1,RB1	Black Board
30	**Scanning Directories:** opendir, readdir Closedir	50min	T1,RB1	Black Board
31	rewinddir, seekdir, telldir functions	50min	T1,RB1	Black Board

On completion of this lesson the student shall be able to(Outcomes)

1. access low level files efficiently
2. manage directories and files in file system

	ASSIGNMENT **Unit-III**	2015-16
		Regulation: R12

Assignment / Questions

1. Write a sed script to print all the lines of a **file** that is passed as command line argument by changing the string madras with Chennai
2. Write in detail with examples on the commands **chown, fgrep, ps and tar**.
3. Write an awk program to print the fields 1 and 4 of a file. That is passed as a command line argument. The file contains lines of information that is separated by "," as delimiter. The awk program must print at the end the sum of all 4^{th} field data.

The main outcome of the assignment is that student can able to write and execute f ile programs their own.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN **Unit-IV**	2015-16 Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit IV

INSTRUCTIONAL OBJECTIVES: 9

Session No	Topics to be covered	Time	Ref	Teaching Method
32	Process concept	**50min**	**T1,RB1**	Black Board
33	Kernel support for process	**50min**	**T1,RB1**	Black Board
34	process attributes, process hierarchy	**50min**	**T1,RB1**	PPT
35	process states,process composition	**50min**	**T1,RB1**	Black Board
36	**process control :** process creation	**50min**	**T1**	Black Board
37	waiting for a process,process termination	**50min**	**T1**	PPT
38	zombie process,orphan process	**50min**	**T1,RB1**	Black Board
39,40	system call interface for process management-fork vfork, exit,	**100min**	**T1,RB1**	Black Board

On completion of this lesson the student shall be able to (Outcomes)

1. Understand the concepts of process, threads, and file structure.
2. Mastery of the basic UNIX process structure and the UNIX file system.

	ASSIGNMENT **Unit-IV**	2015-16
		Regulation: R12

Assignment / Questions

1. Develop an awk program to summarize from the list of all processes, a count of processes run by every user (including root)?
2. Differentiate between zombie and orphan processes?
3. Explain about process attributes?

The main object of the assignment is to know the different processes in file system
And the main outcome of the assignment is that student can able to understand different processes in file system.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-V	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit V

INSTRUCTIONAL OBJECTIVES: 9

Session No	Topics to be covered	Time	Ref	Teaching Method
41	Introduction to signals	50min	T2	Black Board
42	Signal generation and handling	50min	T2	Black Board
43	Kernel support for signals	50min	T2	PPT
44	Signal function	50min	T2	Black Board
45	unreliable signals	50min	T2	Black Board
46	reliable signals	50min	T2	PPT
47	kill, raise , alarm	50min	T2	Black Board
48,49	pause, abort, sleep functions	100min	T2	Black Board

On completion of this lesson the student shall be able to(Outcomes)

1. Know the differences of reliable and unreliable signals
2. Can understood signal generation and handling concept

	ASSIGNMENT **Unit-V**	2015-16
		Regulation: R12

Assignment / Questions

1. Explain about kernel support for signals?
2. Differentiate kill and abort , sleep and rise factions?
3. Explain about different types of signals
4. What are reliable signals? Explain about the primary features of reliable functions illustrate an example program for handling for handling reliable signals?

The main objective of the assignment is should be able to understood the signal concept

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-VI	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit VI

INSTRUCTIONAL OBJECTIVES: 11

Session No	Topics to be covered	Time	Ref	Teaching Method
50	Introduction to IPC, IPC between processes on a single computer system	50min	T3	Black Board
51	IPC between processes on different systems,	50min	T3	Black Board
52,53	Pipes and FIFOs	100min	T3	PPT
54	**Introduction to three types of IPC(Linux**)-message queues, semaphores and shared memory.	50min	T3	Black Board
55,56	**Message Queues**- Kernel support for messages	100min	T3	Black Board
57	Linux APIs for messages, client/server example.	50min	T3	PPT
58	**Semaphores:** Kernel support for semaphores	50min	T3	Black Board
59	Linux APIs for semaphores,	50min	T3	Black Board
60	file locking with semaphores.	50min	T3	Black Board

On completion of this lesson the student shall be able to (Outcomes)

1. Mastery of the basic UNIX process structure and the UNIX file system.
2. Familiarity with Interprocess Communication using pipes, shared memory, semaphores and messages.

	ASSIGNMENT **Unit-VI**	2015-16
		Regulation: R12

Assignment / Questions

1. Briefly explain about inter process communication?
2. Briefly explain about semaphores, shared memory and message queues?

The main outcome of the assignment: Student can understood the concept of IPC

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-VII	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit VII

INSTRUCTIONAL OBJECTIVES: 9

Session No	Topics to be covered	Time	Ref	Teaching Method
61	Differences between threads and processes	50min	T3	Black Board
62	Thread structure and uses	50min	T3,RB2	Black Board
63	Threads and Lightweight Processes	50min	T3	PPT
64,65	POSIX Thread APIs	100min	T3,RB2	Black Board
66	Creating Threads	50min	T3	Black Board
67	Thread Attributes	50min	T3	PPT
68	Thread Synchronization with semaphores	50min	T3,RB2	Black Board
69	Thread Synchronization with Mutexes	50min	T3,RB2	Black Board

On completion of this lesson the student shall be able to

Understand the multithread programming

	ASSIGNMENT **Unit-VII**	2015-16 Regulation: R12

Assignment / Questions

1. Differentiate between threads and processes
2. Explain about POSIX thread API's
3. Briefly explain about thread synchronization with semaphores and mutex

Outcome of the assignment :Students can able to understand the concepts of process, threads, and file structure.

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.

	LESSON PLAN Unit-VIII	2015-16
		Regulation: R12

Name of the Faculty: P.PREM KUMAR

Subject Linux Programming Subject Code 6756032

Unit VIII

INSTRUCTIONAL OBJECTIVES: 7

Session No	Topics to be covered	Time	Ref	Teaching Method
70	Introduction to Linux Sockets	50min	T3,RB2	Black Board
71,72	Socket system calls for connection oriented protocol	100min	T3RB2	Black Board
73,74	Socket system calls for connectionless protocol	100min	T3RB2	PPT
75,76	example-client/server programs	100min	T3,RB2	Black Board

On completion of this lesson the student shall be able to

.Design various client server applications using TCP or UDP protocols.

	ASSIGNMENT **Unit-VIII**	2015-16
		Regulation: R12

Assignment / Questions

1. Explain about client server programming
2. Explain about connection oriented and connection less protocol
3. Briefly explain about socket system calls

Outcome of the assignment: student can able to understand the client ,server programming and socket system calls

Signature of Faculty

Note: Mention for each question the relevant objectives and outcomes.