

# **Solapur University, Solapur**



**B.Sc.III (Computer Science)**

**Syllabus (Semester – V and VI)**

**(Choice Based Credit System)**

**With Effect from June 2018**

## Semester-V

Paper Code	Paper Name	Theory/ Practical	UA	CA	Total
IX	Visual Programming using C#	Theory	70	30	100
X	Core Java	Theory	70	30	100
XI	Operating System	Theory	70	30	100
<b>Elective</b>					
XII	Python	Theory	70	30	100
XII	Software Testing	Theory	70	30	100

## Semester-VI

Paper Code	Paper Name	Theory/ Practical	UA	CA	Total
XIII	Web Technology	Theory	70	30	100
XIV	Advanced Java	Theory	70	30	100
XV	Data communication and networking	Theory	70	30	100
<b>Elective</b>					
XVI	AngularJS	Theory	70	30	100
XVI	Linux Operating System	Theory	70	30	100
Practical IV	Based on paper IX, XIII	Practical	70	30	100
Practical V	Based on paper X, XIV	Practical	70	30	100
Practical VI	Project Based on IX, X, XII, XIII, XIV, XVI	Practical	70	30	100
Practical VII	Based on paper XII, XVI	Practical	70	30	100

### Equivalence

Old Paper	New Paper
<b>Sem-V</b>	
Visual Programming	Visual Programming using C#
Core Java	Core Java
Operating System-I	Operating System
Data communication and networking-I	Data communication and networking
<b>Sem-VI</b>	
Web technology	Web Technology
Advanced Java	Advanced Java
Operating System-II	Linux



## **Semester – V**

### **Visual Programming Using C#**

#### **Unit 1: .NET Architecture**

**(6)**

Block diagram of .net framework, The Common Language Runtime, Advantages of Managed Code, A Closer Look at Intermediate Language & Assemblies-Support for Object Orientation and Interfaces, Distinct Value and Reference Types, Strong Data Typing, Garbage Collection

#### **Unit 2: C# Basics**

**(6)**

Compiling and Running the Program, Variables, Data Types, Flow Control, Enumerations, Namespaces-The using Statement, Namespace Aliases, The Main() Method-Multiple Main() Methods, defining & using functions & its scope, Passing Arguments to Main(), Parameter passing technique.

#### **Unit 3: Objects and Types**

**(4)**

Classes and Structs, Class Members- Data Members, Function Members read-only Fields, properties and indexer, The Object Class-System, Object Methods, The ToString() Method

#### **Unit 4: Inheritance and Polymorphism**

**(8)**

Introduction-Types of Inheritance, Implementation Inheritance- Abstract Classes and Functions, Sealed Classes and Functions, Constructors and its types, Destructor, Interfaces-Defining and Implementing Interfaces, Derived Interfaces, Polymorphism - Method overloading, Operator overloading.

#### **Unit 5: Exception Handling**

**(4)**

Try, catch, and throw, finally, Nested try, Custom exception

#### **Unit 6: Threading**

**(4)**

Introduction- Applications with Multiple Threads, Thread Priorities, Synchronization, Life Cycle.

#### **Unit 7:File I/O and Streams**

**(4)**

Stream Classes, Console I/O, File Stream and Byte-Oriented File I/O, Character based File I/O.

#### **Unit 8: Collection Classes**

**[4]**

• Generic collection • Non generic collection

#### **Reference books:**

1. Professional C# - Wrox Publication by Simon Robinson, Christain Nagel, Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen.
2. Inside C# - Microsoft Press by Tom Archer, Andrew Whitechapel.
3. Programming Microsoft Visual C# 2005 - The Language (Microsoft Press) by Donis Marshall

# Core Java

## **Unit 1: Introduction to Java Programming (4)**

Overview of Java, Features of Java as programming language /Platform, JDK Environment and Tools

## **Unit 2: Java Programming Fundamentals (4)**

Data types, Variables, Operators, Keywords, Naming Conventions, Structure of Java Program, Flow Control- Decision, Iterations, Arrays, Class – Members access control, Objects, Constructors, Use of ‘this’ keyword, Static, non-static data members and methods., public, private & protected data members

## **Unit 3: Inheritance & Polymorphism (10)**

Access/Scope specifiers protected, Super, extends, single, multiple inheritance, Method overriding, Abstract classes & ADT, ‘final’ keyword, Extending interfaces

## **Unit 4: Exception Handling and Java I/O (4)**

Exceptions and Types, try..catch, finally block, throw & throws statement, user-defined exceptions, Java I/O package, byte & character stream, reader & writer, file reader & writer

## **Unit 5: Threading (4)**

Java thread lifecycle, Thread class & run able interface Thread priorities & synchronization, Usage of wait & notify

## **Unit 6. Collection framework : (4)**

Collection overview, Collection interfaces, Collection classes Vector, Array list, Hash map, Hash table, Tree map, Tree set, Hash set, Properties, Stack

## **Unit7: AWT, Applet, Swing and event handling: (10)**

Layout Managers :Border, Flow, Grid, Event Model, Listeners / Adapters, Anonymous classes, Introduction to Applet, Applet life cycle,types of applet,applet html tags, Introduction to AWT, Introduction to swing, difference between AWT and swing, hierarchy of Swing classes, Swing controls: - JButton, JTextfield, JLabel, JCheckBox, JRadionButton, JFame, Jtable, JList, JoptionPane, JMenuitem and JMenu ,etc

### **Reference Books:**

1. Java 2 for professional developers by Michael Morgen
2. Core Java Vol 1 and vol 2 by Cay. S. Horstmann, Gray Cornell.
3. Java by Nutshell
4. Java The complete Reference by Herbert Schildt
5. Thinking in java by Bruceel

# Operating System

## **Unit 1: Introduction Operating System:- (10)**

Definition Operating systems, Types of Operating Systems-Batch, Multiprogramming, Time-Sharing, Real-Time, Distributed, Parallel., OS Service, System components, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine

## **Unit 2: Process Management:- (15)**

Concept of Process, Process states, Process Control Block, Context switching, Operations on Process, Co-operating Process, Threads – Types of threads, Benefits of threads.

Concept of Process Scheduling- Types of Schedulers ,Scheduling criteria , Scheduling algorithms : Preemptive and Non-pre emptive , FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling, Multilevel- feedback Queue Scheduling.

**Process Synchronization and Deadlocks:-** The Producer Consumer Problem, Race Conditions, Critical Section Problem, Semaphores, Classical Problems of Synchronization: Reader-Writer Problem, Dining Philosopher Problem, Critical Regions.

Definition, System Model, Dead Lock Characterization, Resource Allocation Graph, Methods of Handling Dead Locks- Deadlock Prevention, Deadlock Avoidance -banker's algorithm, resource-request algorithm, Deadlock detection and Recovery.

## **Unit 3: Storage Management (15)**

**Memory Management :-** Basic Hardware Address Binding, Logical and Physical address Space, Dynamic Loading, Overlays, Swapping,

**Memory allocation :** Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction, Paging, Segmentation. Basics of Virtual Memory, demand paging, Page fault, Page Replacement policies: Optimal (OPT), First in First Out (FIFO), Least Recently used (LRU), Thrashing.

**Storage Management:-** File Management: File concept, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping).

**Disk Management:** disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN), disk reliability, disk formatting, boot block, bad blocks.

### **Reference Books:**

1. System programming and O.S. By D.M. Dhamdhare.
2. Modern O.S. By Andrews Tanenbaum.
3. Operating System Concepts By Siberchatz and Galvin.
4. Operating System(Unix) By Bach

# Elective

## Python

### 1: Introduction to Python:

(4)

Features/Characteristics of Python, Installation and Working with Python, Structure of a Python Program, Writing simple python program, Executing python program using command line window and IDLE graphics window, Python Virtual Machine, Identifiers and Keywords, Operators (Arithmetic operators, Relational operators, Logical or Boolean operators, Assignment Operators, Bit wise operators, Membership operators, Identity operators), Operator Precedence and Associativity

### 2: Python Data Types:

(4)

Python Variables, Data types in python, Built-in Datatypes, Bool datatype , Sequences in python, Sets, Literals in python, User Defined Datatypes, Constants in python, Type conversion, Input and Output Statements, Command line arguments

### 3: Control Statements:

(4)

Conditional Statements: if, if-else, nested if –else, Looping: for, while, nested loops, Loop manipulation using pass, continue, break, assert and else suite

### 4: Strings, Collection Lists, Tuples and Dictionaries:

(8)

Strings: Introduction to String, String Manipulation., Collection List: Introduction to List, Manipulating list., Tuples: Introduction to Tuples, Manipulating Tuples., Dictionaries: Concept of Dictionary, Techniques to create, update & delete dictionary items.

### 5: Functions, Modules

(6)

Difference between a Function and a Method, Functions:- Defining a function, Calling a function, Advantages of functions, Types of functions, Function parameters:-Formal parameters, Actual parameters, Anonymous functions, Global and Local variables, Modules:- Importing module, Creating & exploring modules, Math module, Random module, Time module

### 6: Object Oriented Programming

(6)

Features, Concept of Class & Objects, Constructor, Types of Variables, Namespaces, Types of Methods, Inner Classes, Constructors in Inheritance, Overriding Super Class Constructors and Methods, Types of Inheritance, Abstract Classes and Interfaces, The Super() Method, Operator Overloading, Method Overloading, Method Overriding

### 7: Regular Expressions

(3)

Introduction to Regular Expression, Advantages & Operations, Sequence characters in Regular Expression, Powerful pattern matching and searching, Password, email, url validation using regular expression, Pattern finding programs using regular expression

### 8: Exception Handling

(2)

Errors in a Program, Exceptions, Exception handling, Types of Exceptions, User-defined Exceptions

### 9: Python File Operation

(3)

Types of File, Opening and Closing a File, Reading and writing to files, Manipulating directories

### Reference Books

1. Python Cookbook: Recipes for Mastering Python 3 by Brian Kenneth Jones and David M. Beazley-O'Reilly Media
2. Beginning Python by Magnus Lie Hetland-Apress

3. Python Programming for the Absolute Beginner by Michael Dawson-Cengage Learning
4. Python for Everybody: Exploring Data in Python 3 by Charles Severance-CreateSpace Independent Publishing Platform
5. Introducing Python: Modern Computing in Simple Packages by Bill Lubanovic-O'Reilly Media
6. Python Programming for Beginners: An Introduction to the Python Computer by Jason Cannon-CreateSpace Independent Publishing Platform
7. Python for Beginners by Harsh Bhasin



## **Elective**

### **Software Testing**

**Unit 1:-Introduction To Software Testing: (6)**

What is Software Testing?, Use or need of software testing. ,Software Development Life Cycle (SDLC)  
:- Water Fall Model, Spiral Model, V- Model, Prototype Model, Hybrid Model

**Unit- 2 White Box Testing: (9)**

Introduction to White box testing, Advantages and Disadvantages of White box testing, Loop Testing, Path Testing , Condition testing , Memory Testing , Performance Testing

**Unit- 3 Black Box Testing: (9)**

Introduction to black box testing , Advantages and Disadvantages of black box testing , Functional Testing- Integration Testing (Incremental Integration Testing ) ,Top Down Incremental Integration Testing , Bottom Up Incremental Integration Testing , Non Incremental Integration Testing , System Testing , Acceptance Testing , Smoke Testing , Exploratory Testing , Adhoc Testing , Performance Testing – Load Testing, Stress Testing, Volume Testing, Soak Testing, Regression Testing-Unit Regression Testing/Retest, Regional Regression Testing, Full Regression Testing

**Unit- 4 Test cases and its design Techniques: (8)**

Introduction to Test Case , Characteristics Of Good Test Case , Test Case Template, How To Write A Test Case, How To Ensure The Test Coverage Is Good , How To Identify whether It Is a Good Test Case Or Not, Review Process/Peer Review , Preparing Review Report, Examples On Writing Test Cases, Test Cases Design Techniques-Error Guessing, Equivalence Partitioning, Boundary Value Analysis

**Unit- 5 Software Test Life cycle and Defect Life Cycle: (8)**

Software Test Life Cycle-Writing Test Plan, Preparing Traceability Matrix, Writing Test Execution Report, Summary Report, Retrospect Meeting /Triage Meetings, Defect Life Cycle-Concept of Defect life cycle, Difference between Bug, Defect, Failure, Error

**Books Recommended:**

- 1) The art of Software Testing– Glenford J. Myers
- 2) Lessons learned in Software Testing – CemKaner, James Bach, Bret Pettichord
- 3) A Practitioner’s Guide to Software Test Design- Lee Copeland
- 4) Software Testing Techniques, 2nd edition- Boris Beizer
- 5) How to Break Software: A Practical Guide to Testing- James Whittaker

## **Semester – VI**

### **Web Technology**

#### **Unit 1: Introduction to ASP.Net**

(2)

Introduction & diff. between ASP & ASP.Net 1.1 & 2.0 Application, Web Architecture Model, Introduction to Visual Studio for Web Application

#### **Unit 2: Application and Page Frameworks**

(5)

Application Location Options, Built-In Web Server, IIS,FTP, Web Site Requiring FrontPage, Extensions, The ASP.NET Page Life Cycle, The ASP.NET Page Structure Options, Inline Coding, New Code-Behind Pages, ASP.NET 2.0 Page Directives, @Page, @Master, @Control, @Import, @Implements, @Register, @Assembly, @PreviousPageType, @MasterType, @OutputCache, @Reference. ASP.NET Page Events, Dealing withPostBacks, Cross-Page Posting, ASP.NET Application Folders, \App\_Code Folder, \App\_Data Folder, \App\_Themes Folder, \App\_GlobalResources Folder, \App\_LocalResources, \App\_WebReferences, \App\_Browsers, Compilation, Global.asax

#### **Unit 3: ASP.NET Server Controls and Validation Controls**

(5)

ASP.Net Server Controls, Understanding Validation, Client-Side versus Server-Side, Validation, ASP.NET Validation Server Controls, Validation Causes, The Required Field Validator Server Control, The CompareValidator Server Control, The RangeValidator Server Control, The RegularExpressionValidator Server Control, The CustomValidator Server Control, The ValidationSummary Server Control, Turning Off Client-Side Validation, Using Images and Sounds for Error Notifications, Working with Validation Groups

#### **Unit4: Working with Master Pages**

(6)

Introduction of Master Pages- The Basics of Master Pages, Coding a Master Page, Coding a Content Page, Mixing Page Types and Languages, Specifying Which Master Page to Use, Working with the Page Title, Working with Controls and Properties from the Master Page, Specifying Default Content in the Master Page, Programmatically Assigning the Master Page, Nesting Master Pages, Master Page Events, Themes and Skins

#### **Unit 5: ASP.Net State Management**

(4)

Application State, Session State, Client & server storing, View state, Cache, Hidden Variable, Session object, Profiles, Overview of HTTP Handler & Modules

#### **Unit 6:Site Navigation**

(4)

Site Navigation technique, SiteMap file, SiteMapPath, TreeView and MenuView control, Using XML file

**Unit 7: ASP.NET web security**

**(4)**

Authentication & Authorization, Windows & forms, User.identity, User.IsInRoles, Using Data Adapter, Debugging & error Handling, ASP.Net tracing, Page Level, Application Level, Debugging, Start Debugging session, Client side debugging, Exception Handling, On page, HTTP status code,

**Unit 8: Data Access with ADO.NET**

**(8)**

ADO.NET Overview, Using Database Connections, Executing Commands, Calling Stored Procedures, Fast Data Access: The Data Reader, Data Adapter

**Unit 9: Introduction to AJAX**

**(2)**

Introduction to AJAX and Need of AJAX, Server side and client side architecture ScriptManager, UpdatePanel, Timer control.

**Reference Books:**

1. Professional ASP.NET 2.0 – Wrox Publication by Bill Evjen, Scott Hanselman, Farhan Muhammed, Srinivasa Sivakumar, Devin Rader.
2. Microsoft ASP.NET 2.0 Step by Step - Microsoft Press by George Shepherd.

## **Advanced Java**

### **Unit -1:-JDBC**

**(8)**

Introducing JDBC: Describing Components of JDBC, Features of JDBC, JDBC Architecture: Types of Drivers: Advantages and disadvantages of Drivers, Use of Drivers, JDBC Statement and Methods:- Statement, PreparedStatement, CallableStatement, execute(), executeQuery(), executeUpdate(), Working with ResultSet interface, Working with ResultSet and Metadata.

### **Unit -2:-Servlet**

**(12)**

Introducing CGI, Introducing Servlet, Advantages of Servlet over CGI, Features of Servlet, Introducing Servlet API, javax.servlet package, javax.servlet.http package, Introducing Servlet, Advantages of Servlet over CGI, Features of Servlet, Servlet life Cycle, Init(), Service(), Destroy(), Working with GenericServlet and HttpServlet, RequestDispatcher interface, Include() and forward(), Use of RequestDispatcher, Session in Servlet, Introducing session, Session tracking mechanism, Cookies, Advantages & disadvantages, use of cookies, Hidden form field, Advantages & disadvantages, use of Hidden form field, URL rewritten, disadvantages, use of URL rewritten, HttpSession, Advantages & disadvantages, use of URL HttpSession

### **Unit -3:- JSP**

**(10)**

Introduction to JSP, Advantages of JSP over Servlet, JSP architecture, JSP life cycle, Implicit objects in JSP- request, response, out, page, pageContext, application, session, config, exception, JSP tag elements- Declarative, Declaration, scriptlet, expression, action., Java Bean- Advantages & Disadvantages, useBean tag- setProperty and getProperty, Bean In Jsp, JSTL core tag: General purpose tag, conditional tag, networking tag, JSTL SQL tags, Custom tag: empty tag, body content tag, iteration tag, simple tag

### **Unit -4:- Hibernate**

**(5)**

Introduction Hibernate(HB), Architecture of HB, Generator classes, Steps to create application of HB:- HB with annotation, Insert ,Delete,update, retrieve records from database in HB, HB web application

### **Unit -5:- Struts**

**(5)**

Introduction to struts, What is struts, Use of struts, Features of Struts, Architecture of struts, Steps to create application of struts

### **Reference Books**

1. Java The complete Reference by Herbert Schildt
2. Java Servlet Programming by Jasan Hunter
3. Beginning Java EE5 from Novice to Professionals by K. Makhar & C. Zelenk
4. Java Server Programming by Bayross & Shah
5. Thinking in java by Bruce

# Data Communication and Networking

## Unit 1. Introduction to Data Communication & Networking (8)

Data Communication: Components, Data Flow, Protocols & Standards, Design Issues of Layers, Connection oriented and connection less services,

Network models :- ISO-OSI reference model, TCP/IP reference model.

## Unit 2. Physical layer (10)

Signals: Analog & Digital Signals, Period, Frequency, Phase, Amplitude, Bandwidth, Bit Rate, Bit Length, Fourier analysis.

Transmission Impairment: Attenuation, Distortion, Noise, Nyquist Theorem, Shannon Capacity Theorem.

Transmission Media:- Guided Media- Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optic Cable,

Unguided Media:- Wireless- Radio Waves, Microwaves, Infrared, Satellite Communication

Digital Transmission: Manchester & Differential Manchester Coding, Pulse Code Modulation

Modulation:- Amplitude Modulation, Frequency Modulation, Phase Modulation

Transmission Mode: Parallel, Serial, Synchronous Transmission, Asynchronous Transmission.

Multiplexing- Frequency Division Multiplexing, Time Division Multiplexing, Wavelength Division Multiplexing.

Switching- Circuit Switching, Message Switching, Packet Switching.

## Unit 3. Data link layer (10)

Error Detection & Correction: Types of Errors, Hamming Distance, Error Detection: Parity Check, Cyclic Redundancy Check, Checksum Check, hamming code

Data Link Control: Framing, Flow & Error Control,

Protocols: Simplex, Stop and Wait, Stop and Wait ARQ, Go Back N ARQ, Selective repeat ARQ, HDLC, Point to Point protocol.

Multiple Access Protocol: ALOHA, CSMA, CSMA/CD,

CSMA/CA Channelization, FDMA, TDMA, CDMA

## Unit 4. Network layer (7)

Network layer Design issues, Routing Algorithm: Optimality Principle, Shortest Path

Routing, Distance Vector Routing, Link State Routing.

Congestion Control Algorithm: General principle of congestion control, Congestion

prevention policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets

Network Devices-Hubs, Switches, Repeaters, Bridges, Routers, Gateways

**Unit 5: Transport, Session, Presentation & Application layers (5)**

TCP/IP protocol suite :- UDP,TCP,SCTP, IP, RTP, FTP, DNS, TELNET, SMTP, POP, HTTP, WWW, SNMP,ARP, RARP.

Data Compression:-Audio Compression, Video Compression

**Reference Books:**

1. Computer Networking by Tannenbaum.
2. Data communication and networking by William Stallings
3. Data communication and networking by B A Forouzan
4. Data communication and networking by Jain

# **Elective**

## **AngularJS**

### **Unit-1:- Overview of AngularJS**

**(3)**

What is AngularJS?, Why AngularJS?, Features of AngularJS, AngularJS architecture, Setting up the Environment, Model-View-Controller explained, My first AngularJS app

### **Unit-2:- Directives**

**(5)**

Introduction to Directives, Directive lifecycle, Using AngularJS built-in directives, Core Directives, Conditional Directives, Style Directives, Mouse and Keyboard Events Directives, Matching directives, Creating a custom directive

### **Unit-3:- Angular Expressions**

**(4)**

All about Angular expressions, How to use expressions, Number and String Expressions, Object Binding and Expressions, Working with Arrays, Forgiving Behaviour, Angular expressions v/s Javascript expressions

### **Unit-4:- Controller**

**(4)**

Role of a Controller, Attaching properties and functions to scope, Nested Controllers, Using filters in Controllers, Controllers in External Files, Controllers & Modules, Controllers

### **Unit-5:- Filters**

**(4)**

Built-in filters, Uppercase and Lowercase Filters, Currency and Number Formatting Filters, OrderBy Filter, Filter Filter, Using AngularJS filters, Creating custom filters

### **Unit-6:- AngularJS Modules**

**(4)**

Introduction to AngularJS Modules, Module Loading and Dependencies, Creation vs Retrieval, Bootstrapping AngularJS

### **Unit-7:- AngularJS Forms**

**(4)**

Working with Angular Forms, Model binding, Understanding Data Binding, Binding controls to data, Form controller, Validating Angular Forms, Form events, Updating models with a twist, \$error object

### **Unit-8:- Scope**

**(4)**

What is scope, Scope lifecycle, Two way data binding, Scope inheritance, Scope & controllers, Scope & directives, \$apply and \$watch, Rootscope, Scope broadcasting, Scope events

**Unit-9:- Single Page Application(SPA)****(4)**

What is SPA, Pros & Cons of SPA, Installing the ngRoute module, Configure routes, Passing parameters, Changing location, Resolving promises, Create a Single Page Application

**Unit-10:- AngularJS Animation****(4)**

ngAnimate Module, CSS transforms, CSS transitions, Applying animations, Directives supporting animation

**Reference Books**

1. Professional AngularJS by Diego Netto and Valeri Karpov-Wrox press
2. Learning AngularJS by Brad Dayley- Addison-Wesley Professiona
3. AngularJS by Brad Green and Shyam Seshadri- O'Reilly
4. Pro AngularJS by Adam Freeman-APress
5. Learning AngularJS: A Guide to AngularJS Development by Ken Williamson- O'Reilly Media
6. Beginning AngularJS by Andrew Grant-Apress



## **Elective**

### **Linux**

#### **Unit 1: Introduction of Linux:-**

**(10)**

History of Linux, Architecture of Linux system & features, Kernel, Shell & its type, Difference between Windows and Linux. Linux Distributions, Working environments: KDE, GNOME, Xface4, Hardware requirement, Installation procedure of Linux, Create partitions, Configuration of X system

Users & Groups Management:- Create Users, Create groups, Special groups, Assigning permissions to users and Groups, File and Directory permissions- chmod, chown, chgrp.

**Linux File System:-**Hierarchy of File system, File System parts- Boot Block, Super Block, Inode Block, Data Block, File types, Devices and Drives in Linux, Mounting devices (CD/DVD, usb, hard drive partition ), file system

#### **Unit 2: Linux Command**

**(15)**

**Linux commands** File and directory Management Commands:-mkdir, rmdir, cd and pwd, file, ls, cat, more, less, File and Directory Operations: find, cp, mv, rm, ln etc, Printing the files - lpr, lpq, lprm etc.

**Filter Commands & Editor:-** Filters: head, tail , pr, cut, paste, sort, uniq, tr, grep, egrep, fgrep, sed.

**Communication commands:-** mesg, talk, write, wall, mail.

**Text Editors-** vi, vim

Archive and File compression commands

**Shell Programming:-** Shell Variables, Meta characters, Shell Scripts – Control and Loop structure, I/O and Redirection, Piping,

#### **Unit 3: Linux System Management**

**(15)**

**Process Management:** Shell process, Parent and children, Process status, System process, Multiple jobs in background and foreground, Changing process priority with nice. Listing processes, ps, kill, premature termination of process.

**Disk management and System Administration:-**Disk Partitioning-RAID, LVM etc., disk related Management Tools- Fdisk, Parted etc. , Boot Loaders-GRUB, LILO, Custom Loaders,

System administration – Role of system administrator, identifying administrative tasks & files, Configuration and log files, Chkconfig, Security Enhanced Linux, Installing and removing packages with rpm command

**Linux Networking:-** Networking services and Configuration files, starting services, Network tools-ping, finger, traceroute, who, host, rlogin, slogin, rcp, rsh, ssh. NFS and NIS.

**Understanding various Servers:-** DHCP, DNS, Squid, Apache, Telnet, FTP, Samba.

**References :**

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. UNIX for programmers and users by Graham Glass & King Ables, Pearson Education
3. Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech India
4. Red Hat Linux Bible by Cristopher Negus, Wiley Dreamtech India
5. UNIX Shell Programming by Yeswant Kanethkar, BPB