

**SHIVAJI UNIVERSITY, KOLHAPUR**  
**New/Revised Syllabus to be implemented from June 2015**  
**BACHELOR OF COMPUTER SCIENCE PART-III ( B.C.S. Part- III)**

**Structure of the course**

**Semester-V**

**Total Six Papers (Five Compulsory and One Elective)**

<b>Paper-no</b>	<b>TITLE OF THE PAPER</b>
IX	Operating system
X	Introduction to VB.net
XI	Data Communication
XII	Software Engineering
XIII	Introduction to Java Programming
XIV	Elective-I Theory of Computation
XV	Elective-II E-Commerce
IV	Lab Course-IV Based on Paper-IX
V	Lab-Course-V Based on paper – X and XIII
VI	Lab Course-VI Software Project

**Semester-VI**

**Total Six Papers (Five Compulsory and One Elective)**

<b>Paper-no</b>	<b>TITLE OF THE PAPER</b>
XVI	Introduction to Linux Operating system
XVII	Object Oriented Programming with VB.net
XVIII	Computer Networks
XIX	Unified Modeling Language
XX	Advanced Java Programming
XXI	Elective-I Compiler Construction
XXII	Elective-II Web Technology
IV	Lab Course-IV Based on Paper-IX and XVI
V	Lab-Course-V Based on paper – X , XIII ,XVII & XX
VI	Lab Course-VI Software Project

**Scheme of Teaching and Examination**  
**Semester-V**

Paper-no	TITLE OF THE PAPER	University Exam Total Marks	Teaching Scheme	
			Theory per week	Practical per week
<b>Compulsory Papers</b>				
IX	Operating system	40+10	4	---
X	Introduction to VB.net	40+10	4	---
XI	Data Communication	40+10	4	---
XII	Software Engineering	40+10	4	---
XIII	Introduction to Java Programming	40+10	4	---
<b>Elective Papers ( Select one paper )</b>				
XIV	Elective-I Theory of Computation	40+10	4	---
XV	Elective-II E-Commerce	40+10	4	---
<b>Laboratory Courses</b>				
IV	Lab Course-IV Based on Paper-IX	---	---	5
V	Lab-Course-V Based on paper – X and XIII	---	---	5
VI	Lab Course-VI Software Project	---	---	5

- Note-** a) Four Lectures per theory course per week.  
b) Lab Course five periods (four hours)-per week per 20 students batch.

**Semester-VI**

Paper-no	TITLE OF THE PAPER	University Exam Total Marks	Teaching Scheme	
			Theory per week	Practical per week
<b>Compulsory Papers</b>				
XVI	Introduction to Linux Operating system	40+10	4	---
XVII	Object Oriented Programming with VB.net	40+10	4	---
XVIII	Computer Networks	40+10	4	---
XIX	Unified Modeling Language	40+10	4	---
XX	Advanced Java Programming	40+10	4	---
<b>Elective Papers ( Select one paper )</b>				
XXI	Elective-I Compiler Construction	40+10	4	---
XXII	Elective-II Web Technology	40+10	4	---
<b>Laboratory Courses</b>				
IV	Lab Course-IV Based on Paper-IX and XVI	100	---	5
V	Lab-Course-V Based on paper – X , XIII ,XVII&XX	100	---	5
VI	Lab Course-VI Software Project	100	---	5

**Note-** a) Four Lectures per theory course per week.

b) Lab Course five periods ( four hours)-per week per 20 students batch.

**SCHEME OF EXAMINATION :-**

- The Theory examination shall be conducted at the end of each semester.
- The Theory paper shall carry 40 Marks.
- The practical examination shall be conducted at the end of each year.
- The Practical paper shall carry 100 marks.

## **Nature of Question papers (Theory)**

### **COMMON NATURE OF QUESTION FOR THEORY PAPER MENTIONED SPERATELY:**

#### **STANDARD OF PASSING:-**

A student will have to secure 40% of marks Theory and Practical examinations..

Nature of Practical Question Paper and scheme of marking (ANNUAL)

#### Nature of Practical Question Paper For Lab Course IV and V

1. The practical paper shall carry 100 marks.
2. There should be two Sections.
3. For Lab course –IV ,Section I should be based on Paper number IX and Section II based paper Number XVI
4. For Lab course –V ,Section I should be based on Paper numbers X and XVII , Section II based on paper numbers XIII and XX.
5. Each Section includes three practical questions.
6. Student has to solve any 3 practical questions.
7. Student has to solve at least 1 Question from Section I
8. Student has to solve at least 1 Question from Section II
9. Each Question carries 25 marks
10. 10 marks for Certified Journal and 15 marks for Viva
11. The total time duration of the practical examination should be 4 hours,

#### Nature For Lab Course VI (Software Project)

This lab course is for 100 marks. In group of maximum two students work on Software Project. Project report will be prepared with every aspects of software engineering is concerned. This project work is follows all the professional guidelines for software engineering. Student should present the online demonstration at the time of project viva-voce.

The distribution of 100 marks will be as follows:

1. Documentation : 30 marks

Analysis, Design, Database, I/O and the process

( As per Standard Project Report Documentation Format )

2. Online Demonstration : 30 marks

3. Project Viva- voce : 40 marks

**EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS- (FOR REVISED SYLLABUS)**

BCS Part- III Sem V

<b>Sr.No.</b>	<b>Title of Old Paper</b>	<b>Title of New Paper</b>
1	Operating system	Operating system
2	VB.net Programming Part-I	Introduction to VB.net
3	Computer Network Part-I	Data Communication
4	Software Engineering Part-I	Software Engineering
5	Java Programming Part-I	Introduction to Java Programming
6	Elective-I Theoretical Computer Science	Elective-I Theory of Computation
7	Elective-II E-Commerce Part-I	Elective-II E-Commerce

BCS Part-III Sem-VI

<b>Sr.No.</b>	<b>Title of Old Paper</b>	<b>Title of New Paper</b>
1	Case Study of Linux	Introduction to Linux Operating system
2	VB.net Programming Part-II	Object Oriented Programming with VB.net
3	Computer Network Part-II	Computer Networks
4	Software Engineering Part-II	Unified Modeling Language
5	Java Programming Part-II	Advanced Java Programming
6	Elective-I Compiler Construction	Elective-I Compiler Construction
7	Elective-II E-Commerce Part-II	Elective-II Web Technology
8	Lab course I on OS	Lab Course IV
9	Lab course II on VB .Net and Java	Lab Course V
10	Lab course III Project	Lab Course VI (Software Project)

**SYLLABUS  
SEMESTER-V**

**Paper No - IX :Title - Operating System**

**Unit-I Introduction**

**10**

- 1.1 Introduction and Definition of operating system
- 1.2 Operating system Services
- 1.3 Simple monitor, buffering, spooling
- 1.4 Protection: I/O, Memory, CPU protection
- 1.5 System calls: types of system call, system call implementation
- 1.6 System programs, Interrupts in operating system

**Unit-II Scheduling concept**

**10**

- 2.1 Process Concept – The process, Process states
- 2.2 Scheduling concept-- Scheduling queues, CPU scheduler
- 2.3 Scheduling criteria (Terminologies used in scheduling)
- 2.4 Scheduling algorithms (FCFS, SJF, Priority, Round Robin, Multiple queue, multilevel feedback queue)
- 2.5 Disk scheduling: FCFS, Shortest seek time first
- 2.6 Scan, C-Scan, Look, C Look

**Unit-III Memory Management & File System**

**10**

- 3.1 Memory Management: Relocation, Swapping, Overlapping, Partitioning and Segmentation
- 3.2 Paging: Page overlaps, demand paging
- 3.3 Page replacement algorithm (FIFO, Optimal, and LRU), virtual memory
- 3.4 File concept, directory structure (Single level, two level, Tree structure, acyclic graph, General graph directory)
- 3.5 Access Methods--Sequential, Direct
- 3.6 Allocation Methods – Contiguous allocation, Linked allocation, Indexed allocation

**Unit-IV Deadlocks & Concurrent processing**

**10**

- 4.1 Deadlock Characterization – Necessary conditions, Resource allocation graph
- 4.2 Deadlock Prevention
- 4.3 Deadlock Avoidance - Safe state, Banker's Algorithm
- 4.4 Deadlock Detection
- 4.5 Recovery from Deadlock – Process termination, Resource preemption
- 4.6 Concurrent processing: Precedence Graph, fork and join, Semaphore

**Reference books:**

1. Operating System Concepts – Silberschatz, Galvin and Gagne (8th edition)
2. System Programming and Operating System – D. M. Dhamdhare
3. Operating System by a God bole Tata Mcgraw-Hill Publishing

**Lab Course-IV**

**( Lab course based on paper IX-Operating System)**

**Practical Program List**

1. Write a program to check status of keyboard using interrupt handler
2. Write a program to implement copy command of DOS.
3. Write a program to display date and time of system
4. Write a program to implement pwd command of linux.
5. Write a program to implement wc command of linux.
6. Write a program to show the mouse coordinates of current cursor position.

## Paper X : Introduction To VB.NET

<b>UNIT-I .NET Framework</b>	<b>10</b>
1.1 Event Driven Programming, .NET as better Programming Platform	
1.2 Introduction to framework	
1.3 .NET Architecture	
1.4 CLR	
1.5 CTS	
1.6 Just-In-Time Compiler, MSIL	
1.7 .NET Framework class library	
1.8 Garbage Collection	
1.9 Assemblies : Assembly content ,Assembly types	
<b>UNIT-II VB.Net Basics</b>	<b>10</b>
2.1 VB.NET Development Environment	
2.1.1 Creating Applications , Building Projects ,Using simple components, Running VB.NET applications	
2.2 Data types	
2.3 Operators-arithmetic, relational, logical, bitwise	
2.4 Control structures	
2.4.1 Branching statements- f –Then Statement(s), Select case Statements	
2.4.2 Looping statements-For–Next, While---End While, Do-----loop while, Do---loop until.	
2.4.3 Unconditional statement: Exit statement, and continue statement	
2.5 Procedures- Functions, Sub procedures or Subs	
<b>UNIT-III Exception Handling</b>	<b>10</b>
3.1 Exception Handling	
3.1.1 Importance of Exception Handling	
3.1.2 Exception Handling in VB.NET	
3.1.3 User defined exception.	
3.2 Classes and Objects	
3.3 Console application	
<b>UNIT-IV Windows Applications in VB.NET</b>	<b>10</b>
4.1 Windows Forms	
4.1.1 Properties: name, IsMDIcontainer, size, window state, location, autosize	
4.1.2 Adding controls to a form	
4.1.3 Setting properties at run time	
4.1.4 Working with input box and message box	
4.1.5 Creating MDI form	
4.2 Controls	
4.2.1 Label Control, TextBox Control,	
4.2.2 Button Control	
4.2.3 ComboBox Control , ListBox Control	
4.2.4 CheckBox Control , RadioButton , GroupBox Control	
4.2.5 Panel, PictureBox,ProgressBar & Timer Controls, Date TimePicker	
4.2.6 Menus,Built-in Dialog Boxes,TreeViewControls	
4.3 Mouse Events :MouseDown ,MouseDoubleClick , MouseEnter , MouseHover , MouseLeave , MouseMove	
4.4 Keyboard Events -Key Press , KeyDown , KeyUp	

### Text Book

Visual Basic.NET console and windows application: A Practical Approach  
by Rajendra Salokhe

### Reference Books:

1. VB.NET Complete Reference-Tata MacGraw Hill
2. Visual Basic.NET Black Book – Steve Holzner
3. Visual Basic.NET Programming Bible – Bill Evje
4. VB.NET in 21 days –Fteven Holzner

**Lab Course – V**  
**(Based on Paper X : Introduction To VB.NET)**

1. Programs on Operators
2. Programs on Control structures
3. Program on procedures
4. Programs on exception handling
5. Creating Forms using Basic controls
6. Simple application using MDI form

**Paper-XI :**  
**Title : Data Communication**

<b>UNIT – I Basics of Data communication</b>	<b>10</b>
1.1. Data Communications	
1.1.1 Concept	
1.1.2 Components-sender, receiver, message, transmission media	
1.2.3 Data Representation	
1.1.4 Data Flow- simplex, half-duplex, or full-duplex	
1.2 Networks	
1.2.1 Definition	
1.2.2 Advantages and disadvantages	
1.2.3 Categories of Networks- LAN, WAN. MAN	
1.2.4 Network Architecture-Client-Server and Peer to peer	
<b>UNIT – II Transmission media and modes</b>	<b>10</b>
2.1 Transmission Media	
2.1.1 Guided Media	
2.1.1.1 Twisted-Pair Cable	
2.1.1.2 Coaxial Cable	
2.1.1.3 Fiber-Optic Cable	
2.1.2 Unguided Media: Wireless	
2.1.2.1 Radio Waves	
2.1.2.2 Microwaves	
2.1.2.3 Infrared	
2.2 Transmission Modes	
2.2.1 Parallel	
2.2.2 Serial	
2.2.2.1 Asynchronous	
2.2.2.2 Synchronous	
2.2.2.3 Isochronous	
<b>UNIT – III Network models</b>	<b>10</b>
3.1 PROTOCOLS AND STANDARDS	
3.1.1 Protocols –concept, syntax, semantics, Timing	
3.1.2 Standards	
3.2 Models	
3.2.1 OSI model	
3.2.2 TCP/IP model	
<b>UNIT – IV Multiplexing and Switching</b>	<b>10</b>
4.1 Multiplexing	
4.1.1 Frequency-Division Multiplexing	
4.1.2 Wavelength-Division Multiplexing	
4.1.3 Time-Division Multiplexing	
4.2 Switching	
4.2.1 Circuit switching- data gram and virtual switching	

- 4.2.2 Packet Switching
- 4.2.3 Message Switching

**Text Book:**

1. Computer Networking: A Top Down Approach Featuring in Internet by James F. Kurose & K. W. Ross

**References:**

1. Behrouz A. Forouzan- Data Communications And Networking - (4th edition) McGraw-Hill
2. Tanenbaum A.S. "computer Network", 3rd Edition, Prentice Hall of India
3. Stalling W, "computer communication Network".(4th edition). Prentice hall of India 1993

**Paper- XII**  
**Title :Software Engineering**

<b>Unit-I Introduction To Software Engineering &amp; Process Models</b>	<b>10</b>
1.1 Introduction to Software Engineering	
1.1.1 Definition, need for SE,	
1.1.2 Software Engineering Problem	
1.1.3 Software Engineering approach	
1.1.4 Causes of and solutions for software crisis	
1.1.5 Program vs. software product	
1.1.6 Software Development Life Cycle	
1.2 Process Models	
1.2.1 Water fall model- Classical, Iterative	
1.2.2 Prototyping Model	
1.2.3 Spiral Model	
1.2.4 Rapid Application Development (RAD)	
1.2.5 Time boxing Model	
1.3 Role and Skills of system Analyst.	
<b>Unit-II Requirement analysis and specification</b>	<b>10</b>
2.1 Requirements Anticipation and Investigation	
2.2 Fact finding methods	
2.3 Software requirement Specification (SRS)- concept, need, characteristics, components, structure of SRS,	
2.4 Types of requirements - functional and non- functional	
2.5 Metrics- size estimation, function point, quality metrics	
<b>Unit-III Planning a software project</b>	<b>10</b>
3.1 Process planning	
3.2 Project estimation-Bottom-Up Estimation Approach, COCOMO Model	
3.3 Project scheduling and staffing	
3.4 Software configuration management plan	
3.5 Quality plan	
3.6 Risk management	
<b>Unit-IV Design and testing</b>	<b>10</b>
4.1 Function-oriented design	
4.1.1 Design principles	
4.1.2 Module level concepts- Coupling and cohesion	
4.1.3 Design notation and specification-structure charts, specification	
4.1.4 structured design methodology	
4.1.5 verification	
4.2 Detail design	
4.2.1 PDL	
4.2.2 Logic/Algorithm design	
4.2.3 Metrics-Cyclomatic Complexity, Data Binding, cohesion metric	
4.3 Coding-	
4.3.1 Programming principles and guide lines	



4.3.2 Coding process

4.4 Testing-

4.4.1 Testing fundamentals and types of Testing- Black Box, White Box

4.4.2 Testing process

**Text Book-**

1. System Analysis and design and Introduction to Software Engineering – Parthsarathi, B.W. Khalkar.

**Reference Books-**

1. An Integrated Approach To Software Engineering by Pankaj Jalote
2. Fundamentals of Software Engineering - Rajib Mall
3. Software Engineering - R.S. Pressman
4. Software Engineering – Martin Shooman
5. Object Oriented Analysis and Design by Bennett, Simon (McGraw Hill)

**Paper- XIII**

**Title :Introduction To Java Programming**

**Unit-I Java Language Basics 10**

1.1 History of Java

1.2 Features of java

1.3 Java Virtual Machine (JVM)

1.4 JDK tool

1.4.1 Concept

1.4.2 Installation steps

1.4.3 Folder structure

1.5 Compilation and execution of java program

1.6 Java Keywords and Data types- Integer(byte, short, int, long), Floating

point(Float, double), character(char), Boolean, NaN

Operators- Assignment, Arithmetic, Bit-wise, Sh

1.7 History of Java ift

1.8 Type conversion

1.8.1 Implicit Conversion

1.8.2 Explicit conversion

**Unit-II Control structure and Classes 10**

2.1 Control Structure

2.1.1 Branching statements- If , if ....else, if ...else if and switch statement

2.1.2 Iterative statements- For loop, Do while, While loop, Break and continue statement

2.2 Classes – definition. Syntax, field variable and local variables, Accessing private variables, methods, Use of methods , static variables and methods, method overloading and overriding, Difference between method overloading and overriding, This keyword,

2.3 Destructor and constructor

2.4 Packages- Access control and concept of a package, class path and package hierarchy, Type casting rules in class hierarchy.

2.5 Wrapper Class

**Unit-III Inheritance, Arrays and collection 10**

3.1 Inheritance

3.1.1 Concept and member access/ visibility (Default, Public, Protected, Private, Private protected)

3.1.2 Types- Single, multi-level, Hierarchical With example

3.1.3 Final and Super keyword

3.1.4 Interfaces and abstract classes

3.2 Arrays- Array creation, Passing arrays to methods, Array of objects, Converting array to string and string to array , methods of array class

3.3 Collections- Vectors, methods of vector class, array list, Hash table and its methods, ListIterator, stack .

**Unit-IV Multithreading and exception Handling 10**

4.1 Multithreading- Concept, difference between process and thread, methods of thread class, runnable interface, isAlive() and join() methods, thread priority, synchronization, wait() and notify() methods, thread life cycle.

4.2 Exception Handling- Concept, types- Checked and unchecked, try and catch block, multiple catch, throws clause, finally clause.

**Lab Course V**

( Lab course based on paper- XIII-Introduction To Java Programming)

**Practical Program List**

- 1.Program on operators and type conversion
- 2.Program on Control Structure
- 3.program on method overloading and overriding
- 4.program on Packages
- 5.program on Destructor and constructor
6. Program on Inheritance
- 7.Program on Arrays and array list
- 8.Program on Exception Handling

**Paper – XIV**

**Title of Paper-(Elective I) Theory Of Computation**

**Unit –I Introduction To Theory of Computation 10**

- 1.1 Symbol
- 1.2 Alphabet
- 1.3 String- Concept, Empty string, Prefix, Suffix and Concatenation of strings
- 1.4 Sets and Operations on Sets
- 1.5Relation and its properties- Equivalence, reflexive, transitive and symmetric
- 1.6 Function- definition, Types( injective, surjective, bijection)
- 1.7 Graphs- Directed and undirected graphs
- 1.8 Languages
- 1.9 Inductive proofs

**Unit –II Finite State Machines 10**

- 2.1 Definition and description of an Automata
- 2.2 Transition system
- 2.3 Deterministic Finite Automata
  - 2.3.1 Acceptability of a string by finite Automata
  - 2.3.2 Design of DFA's
- 2.4 Non Deterministic Finite Automata
  - 2.4.1 Acceptance of a string by NFA
  - 2.4.2 Design of NFA's
- 2.5 Equivalence of NFA and DFA
  - 2.5.1 Algorithm to convert DFA from NFA
- 2.6 NFA with  $\epsilon$  Transition
- 2.7 Construction of NFA without  $\epsilon$  moves from NFA with  $\epsilon$  moves
- 2.8 Minimization of Finite automata

**Unit –III Regular Expression 10**

- 3.1 Regular Expression-Definition, example
- 3.2 Arden's Theorem
- 3.3 Equivalence of RE and FA
- 3.4 Properties of Regular Sets

3.4.1 Pumping lemma for Regular Set	
3.4.2 Application of Pumping Lemma	
3.4.3 Closure Properties of Regular Sets	
3.4.4 Decision Algorithm for regular sets	
3.4.5 Minimization of Finite Automata	
<b>Unit –IV Context Free Languages</b>	<b>10</b>
4.1 Context Free Grammars- Definition and Examples	
4.2 Derivation Trees	
4.2.1 Left Most Derivation	
4.2.2 Right Most Derivation	
4.3 Ambiguous Grammar –Concept and Examples	
4.4 Simplification of CFG –Elimination Of Useless Symbols, Elimination of $\epsilon$ -productions, Elimination of Unit Productions	
4.5 Normal Forms	
4.5.1 Chomsky Normal Form	
4.5.2 Greibach Normal Form	
4.6 Pushdown Automata	
4.6.1 Basic Definition and Model of PDA	
4.6.2 Deterministic Push down Automata	
4.6.3 Non-Deterministic Push down Automata	

#### **Text Book**

1. Theory of computer science by Vivek Kulkarni.

#### **Reference Books**

1. Theory of Computation- by G. P. Saradhi Varma and B Rao
2. Theory of computer science: E.V. Krishnamoorthy.
3. Introduction to automata theory, languages and computation – John E. Hopcroft & Jeffery D. Ullmann
4. Theory of computer science by Mishra & chandrasekharan.
5. Introduction to languages and the theory of computation , John C. Martin

### **Paper-XV**

#### **Title of Paper-(Elective II) E-Commerce**

<b>Unit –I Introduction To E-commerce</b>	<b>10</b>
1.1 E-Commerce-Introduction And Definition	
1.2 Goals of E-Commerce	
1.3 Components of E-Commerce	
1.4 Advantages and disadvantages of E-Commerce	
1.5 Applications of e-commerce	
1.6 E-Commerce models-( B2B, B2C, C2B, C2C, B2G )	
<b>Unit –II The Internet and its Security</b>	<b>10</b>
2.1 Internet –concept, use, applications	
2.2 Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.)	
2.3 Internet Service Provider	
2.4 World Wide Web	
2.5 Secure Transaction- concept, Authentication and authorization	
2.6 Privacy on Internet	
2.7 Computer Crime ( Laws , Types of Crimes)	
2.8 Threats-Concept, Types	
2.9 Hacking and Virus	
2.10 Cryptography- Concept, Encryption and Decryption	
2.11 Digital Signature	
<b>Unit –III Electronic Data Exchange</b>	<b>10</b>
3.1 EDI concept	
3.2 Advantages and disadvantages of EDI	

3.3 Applications of EDI	
3.4 EDI model	
<b>Unit –IV Electronic Payment System</b>	<b>10</b>
4.1 Electronic payment- concept	
4.2 Types of Electronic Payment System-Pre-paid, instant-paid, post-paid	
4.3 Electronic Fund Transfer	
4.4 Value Exchange System	
<b>Text Book</b>	
1. E-Commerce Concepts, Models, Strategies- :- G.S.V.Murthy Himalaya Publishing House	
2. E- Commerce :- Kamlesh K Bajaj and Debjani Nag	
<b>Reference Books-</b>	
1. Electronic Commerce - Ravi Kalakota and Andrew Whinston PEARSONS	
2. E-commerce - Deepak Goel S. Chand	
3. E-Commerce by S. Jaiswal – Galgotia Pub.	
4. E-commerce , Business on the Net Kmalesh Agarwal Mc Millan	

**SEMESTER -VI**  
**Paper - XVI**  
**Title- Introduction to Linux Operating System**

<b>Unit-I Introduction</b>	<b>10</b>
1.1 Operating system	
1.2 Types of operating system	
1.3 Functions of operating system	
1.4 History and development of Linux	
1.5 Features of Linux	
1.6 Concept of shell , kernel , Kernel-shell relationship	
<b>Unit-II Handling Linux Environment</b>	<b>10</b>
2.1 Login , logout and remote login	
2.2 Different GPU ( cal , date, wc, who )	
2.3 Concept of file, types, file system tree, file handling- ls ,cat ,cp, mv , rm . lp commands , listing file names using meta characters ( * , ? , [ ] ).	
2.4 Concept of directory , home directory , directory handling- cd , mkdir , rmdir	
2.5 Basic file attributes , change file/directory access permissions –ls –l , chmod command.	
2.6 Basic filters –head , tail , sort , grep, different options and expressions for grep	
<b>Unit-III VI editor</b>	<b>10</b>
3.1 Editor, use of VI , features of VI	
3.2 Vi basics , different modes and working with VI	
3.3 Command mode -cursor movements( k,j,h,l), delete( character, line, word), Screen up , down use of repeat factor , joining lines (J)	
3.4 Input mode- switching with ( I,o,r,s,a,l,O,R,S,A)	
3.5 ex mode – saving ( w, x, q ) , writing selecting lines to another file.	
3.6 searching for pattern ( / and ?), Search and replace	
<b>Unit-IV Essential Shell programming</b>	<b>10</b>
4.1 Shell Script , running a shell script	
4.2 Statements – read , echo , test , if case , exit , expr	
4.3 Loops- while , until , for	
4.4 manipulating positional parameters – set and shift	
4.5 Here document ( <<)	
4.6 Exit status of a command	

## Reference books-

1. Unix concept and applications ----- Sumitabha Das
2. Linux programming- Foreword By- Alan Cox
3. RedHalt Linux 718 Bill Ball , David Pitts
4. Unix shell programming- Yashwant Kanetkar

## Lab course-IV

(Lab course based on paper- XVI- Linux Operating system)

Practicals-

- Remote login procedure through telnet- login , logout
- Display , copy , move , delete and print files from different directories
- Change file access permissions using chmod and confirm using ls -l command
- Creating text files using VI editor

Shell scripts-

1. Write a shell script to get any number and display its square , cube sum of its digits .
2. Write a script to display sequences such as  
2 4 6 8 10  
0 1 1 2 3 5 8
3. Use of set and shift in a script to use positional parameters.
4. Write a script using case structure to validate inputs
  - a) Accept only two digit number.
  - b) Accept employee code such as first character of code must be a letter
  - c) Accept only four character long string.

## Paper XVII

### Title : Object Oriented Programming With VB.NET

#### UNIT-I OOPs concepts withVB.net

10

- 1.1 Class and Object
- 1.2 Properties, methods and events.
- 1.3 Constructors and Destructors
- 1.4 Method overloading and overriding, its difference
- 1.5 Inheritance
- 1.6 Access modifiers: Public, Private, Protected, Friend.
- 1.7 Interfaces.
- 1.8 Polymorphism.

#### UNIT-II. Database connectivity in VB .NET

10

- 2.1 Database: Connections, command, Data adapters, and datasets, name spaces
- 2.2 Connection to database using MS-Access, SQL Server
- 2.3 Data binding with controls like Text Boxes, List Boxes, Data grid etc.
- 2.4 Data form wizard
- 2.5 Data validation

#### UNIT-III Using Crystal Report

10

- 3.1 Connection to Database, Table, Queries
- 3.2 Create and Modify Report
- 3.3 Formatting Fields and inserting Header, Footer, Details
- 3.4 Working with formula fields, Parameter fields, Group
- 3.5 Working with Multiple Tables

#### UNIT-IV ASP .NET with VB.NET

10

- 4.1 Introduction to ASP. NET
- 4.2 Working with web forms: Buttons, Text Boxes, Labels, Check Boxes, Radio Buttons, Tables, Panels, Images, Image Buttons, List Boxes, Drop-Down Lists, Hyperlinks and Link Buttons
- 4.3 Event handling and name spaces.
- 4.4 Creating Master page with Multiform web application
- 4.5 Embedding VB Code in web pages

**Text Book**

Visual Basic.NET console and windows application: A Practical Approach  
by Rajendra Salokhe

**Reference Books:**

1. VB.NET Complete Reference-Tata MacGraw Hill
2. Visual Basic.NET Black Book – Steve Holzner
3. Visual Basic.NET Programming Bible – Bill Evje
4. VB.NET in 21 days –Fteven Holzner
5. Pro ADO.NET with VB.NET – Sahil Mailk and Paul Dickinson
6. Mastering Crystal Report - BPB Publication
7. Crystal Report – The Complete Reference: - Tata McGraw Hill

**Lab Course –V**

**(Based on Paper XVII : Object Oriented Programming With VB.NET )**

1. Programs on Object oriented concept
2. Simple Applications using database
3. Report creation using crystal report
4. Web application using controls
5. Creating Master page with Multi-form web applications.

**Paper- XVIII**

**Title :Computer Networks**

**UNIT – I Physical and Data link Layer****10**

## 1.1 Physical layer:

- 1.1.1 Digital-to-analog conversion: concept, Amplitude Shift Keying, Frequency Shift Keying
- 1.1.2 Analog-to-digital conversion: Pulse Code Modulation (PCM),Delta Modulation (DM)

## 1.2 Data link layer

- 1.2.1 Design issues, Framing, error detection and correction,
- 1.2.2 Protocols: Sliding window protocol: one bit sliding window protocol, protocol using go back, protocol using selective repeat

**UNIT – II Network and Transport layer****10**

## 2.1 Network layer:

- 2.1.1 Design issue
- 2.1.2 Concept of routing
- 2.1.3 Routing algorithm (shortest path, Flooding, distance vector,)
- 2.1.4 Congestion control algorithms (Leaking bucket, Token Bucket)

## 2.2 Transport layer:

- 2.2.1 Services: connection oriented and connection less services
- 2.2.2 Transport Layer Primitives: listen, connect, send, receive, disconnect
- 2.2.3 Protocols: TCP, UDP

**UNIT – III Session and Presentation layer****10**

## 3.1 Session layer:

- 3.1.1 Services: dialog management, synchronization, activity management, exception handling
- 3.1.2 Remote procedure calls

## 3.2 Presentation layer:

- 3.2.1 Services: Translation, compression, encryption
- 3.2.2 Cryptography: concept, symmetric key & asymmetric key cryptography

## **UNIT – IV Application layer and network security**

**10**

- 4.1 Application layer:
  - 4.1.1 Function
  - 4.1.2 Domain name system (DNS),Hypertext Transfer Protocol (HTTP),Simple Mail Transfer Protocol (SMTP) ,Telnet, File Transfer Protocol (FTP)
- 4.2 Network security:
  - 4.2.1 Security concept and services
  - 4.2.2 Message Authentication
  - 4.2.3 Digital Signatures
  - 4.2.4 Entity authentication

### **Text Book:**

1. Computer Networking: A Top Down Approach Featuring in Internet by James F. Kurose & K. W. Ross

### **References:**

1. Behrouz A. Forouzan- Data Communications And Networking - (4th edition) McGraw-Hill
2. Tanenbaum A.S. “computer Network”, 3rd Edition, Prentice Hall of India
3. Stalling W, “computer communication Network”.(4th edition). Prentice hall of India 1993

## **Paper- XIV**

### **Title- Unified Modeling Language**

#### **Unit-I Introduction to UML**

**10**

- 1.1 UML History
- 1.2 Introduction to UML
- 1.3 Advantages of UML
- 1.4 Architecture of UML
- 1.5 UML View
- 1.6 Static View: Classifiers, Relationships Associations, Generalization, Realization, Dependencies, Constraint, Instances.

#### **Unit II Modeling Concepts**

**10**

- 2.1 Systems, Models, and Views
- 2.2 Data Types, Abstract Data Types, and Instances
- 2.3 Classes, Abstract Classes, and Objects
- 2.4 Event Classes, Events, and Messages
- 2.5 Object-Oriented Modeling

#### **Unit III UML Diagram-I**

**10**

- 3.1 Use Case Diagrams: Overview, Actor, communication and relationships, Use case examples
- 3.2 Class Diagrams: classes and object, association and links, multiplicity, inheritance, example
- 3.3 State Machine Diagrams: State, Event, Composite State, transition, activity, example

#### **Unit IV: UML Diagram-II**

**10**

- 4.1 Interaction Diagrams:
  - 4.1.1 Overview
  - 4.1.2 Sequence Diagrams: Activation, examples
  - 4.1.3 Collaboration Diagrams: Pattern, example
- 4.2 Activity Diagrams: Activities, actions, decisions, control nodes, fork and join node
- 4.3 Component diagram:
  - 4.3.1 Concept of component
  - 4.3.2 Basic components in UML
  - 4.3.3 Required interfaces of component
  - 4.3.4 Examples

**Text Book**

1. UMLTM 2 Toolkit By Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado

**Reference Books:**

1. Learning UML 2.0 by Kim Hamilton, Russell Miles
2. Object-Oriented Software Engineering Using UML, Patterns, and Java™ by Bernd Bruegge & Allen H. Dutoit
3. The Unified Modeling Language Reference Manual by James Rumbaugh, Ivar Jacobson, Grady Booch
4. Object Oriented Software Engineering by Ivar Jacobson (Pearson Edu. INC)
- 5.. Applying UML and Patterns by Craig Larman

**Paper- XX****Title :Advanced Java Programming**

<b>Unit I Abstract Window Toolkit (AWT) and swing</b>	<b>10</b>
1.1 Abstract Window Toolkit (AWT)	
1.1.1 Concept	
1.1.2 Components used in AWT	
1.1.3 AWT controls and layout managers	
1.2 Swing	
1.2.1 Concept, MVC architecture	
1.2.2 Component of swing: JFrame, JComponent, JLabel, JTextfields, JCheckbox, JPanel, JRadiobuttons, JTabbed Pane, JButton, JTree, JTable, JMenu	
1.3 Difference between AWT and Swing	
<b>Unit II Java Data Base Connectivity (JDBC)</b>	<b>10</b>
2.1 Introduction	
2.2 Types of Drivers	
2.3 JDBC program: Connection, Statements, ResultSet,	
2.4 Simple program	
2.5 Executing commands and SQL queries.	
<b>Unit III Servlet</b>	<b>10</b>
3.1 Introduction of servlet: How servlet work, installation, model diagram	
3.2 Uses of servlet	
3.3 Life cycle of servlet	
3.4 Servlet API: packages- javax.servlet and javax.servlet.http	
3.5 Session	
3.6 cookies: types, advantages and disadvantages	
3.7 servlet jdbc	
<b>Unit IV Java Server Page (JSP)</b>	<b>10</b>
4.1 Concept	
4.2 Life cycle methods in JSP	
4.3 JSP Vs Servlet	
4.4 Components of JSP: Directives, Tags, Scripting elements	
4.5 Implicit objects of JSP	
4.6 Connecting to database	
4.7 Simple application using JSP.	



## Lab Course V

( Lab course based on paper- XX-Advanced Java Programming)

### Practical Program List

- 1.Program on Swing
2. Program on AWT
3. Program on Database Connection
- 4.Program on cookie and Session
- 5.Program on Servlet JDBC
6. Simple application using JSP.

## Paper – XXI

### Title of Paper-(Elective I) Compiler Construction

#### Unit –I Introduction To Compiler

10

##### 1.1 Introduction to Languages

1.1.1 Types of languages - machine dependent and machine independent

1.1.2 Translator- Concept ,types - Compiler, Interpreter, Assembler and it's comparison

##### 1.2 A language –processing system

##### 1.3 Structure Of Compiler- Phases of compiler, compiler Construction Tools,

#### Unit –II Syntax Directed Translation

10

2.1 Syntax Definition – Definition of Grammars, Derivations, Parse Trees, Ambiguity, Associativity Of Operators, Precedence of Operators

##### 2.2 Syntax Directed Translation

2.2.1 postfix Notation

2.2.2 Synthesized Attributes

2.2.3 Tree Traversals

2.2.4 Translation Scheme

#### Unit –III Lexical Analysis and Syntax Analysis

10

##### 3.1 Lexical Analysis

3.1.1 Role of Lexical Analyzer

3.1.2 Lexical Analysis

3.1.3 Token ,patterns, Lexemes

3.1.4 Attributes of Tokens

3.1.5 Lexical Errors

##### 3.2 Input Buffering

3.2.1 Buffer pairs

3.2.2 Sentinels

##### 3.3 Syntax Analysis

3.3.1 The Role of Parser

3.3.2 Representative Grammars

3.3.3 Syntax Error Handling

3.3.4 Error Recovery Strategies

3.3.5 Context Free Grammars

3.3.6 Parsing

3.3.6.1 Top down Parsing

3.3.6.2 Bottom Up Parsing

3.3.6.3 Introduction to LR Parsing

#### Unit –IV Code Generation

10

##### 4.1 Intermediate Code Generation

4.1.1 Three- Address Code

4.1.2 Type checking

4.1.3 Control Flow

4.1.4 Back patching

##### 4.2 Code Generation

4.2.1 Issues in the design of code generator

- 4. 2.2 Simple target machine model
- 4.2.3 Addresses in the target code

**Text Book**

- 1. Compiler Construction - Dhamdere (Mc-Millan)

**Reference Books**

- 1. Compilers - Principles, Techniques and Tools - A.V. Aho, R. Shethi and J.D.Ullman ( Addison wesley publishing company.)
- 2. Compiler Construction - Barret, Bates, Couch (Galgotia)
- 3. Theory of computation : by Kohen

**Paper- XXII**

**Title of Paper-(Elective II ) Web Technology**

<b>Unit –I Introduction to HTML</b>	<b>10</b>
1.1 Introduction – Concept, Advantages and disadvantages of HTML, Basic structure of HTML program	
1.2 Basic Tags of HTML –< HTML>, <HEAD><TITLE><BODY>	
1.3 Text Formatting tags- <B><I>,<U>,<SUB>,<SUP>,<P>,<HR>, <EM><FONT>	
1.4 List Tags-<OL>, <UL><DL>	
<b>Unit –II Advanced HTML</b>	<b>10</b>
2.1 Links - Anchor tag <A>, working with images-<IMG> tag	
2.2 Tables -< TABLE> tag and its attributes	
2.3 Frames: <FRAME> and <FRAMESET> Tag with their attributes	
2.4 Forms : <FORM> tag INPUT Tag - TextBox - Radio Button – Checkbox – SELECT Tag and Pull Down Lists : Hidden - Submit andReset	
<b>Unit –III Cascading Style Sheet (CSS)</b>	<b>10</b>
3.1 Introduction – Features – Style Sheet basics	
3.2 Working with CSS files – Syntax –	
3.3 Types of Style Sheets- Inline Styles, Embedded Styles, External or Linked Styles	
3.4 Formatting Text and Fonts: Font Families, Font Size Kerning, Leading, and Indenting	
3.5 Formatting Colors and Backgrounds: The Color Attribute, The Background Attribute Background Colors and Images.	
<b>Unit –IV Introduction to Web application</b>	<b>10</b>
4.1 History of the web, what is web?	
4.2 Architecture of World Wide Web	
4.3 Steps in web development	
4.4 Tips for designing web page.	

**Text Books**

- 1. Teach yourself Web Technologies - Ivan Bayross – (BPB)
- 2. Web Technology - Ramesh Bangia - Reprint 2008

**Reference Books**

- 1. HTML4 Unleashed – Rick Dranell
- 2. Dynamic Web Publishing Unleashed – Shelly Power.
- 3. HTML and Web designing - Kris Jama and Konrad King, (McGrawHill)  
The E-Biz Primer How to design profitable websites and portals Alexis Leon and Mathews Leon

## Paper no. VI

### Title of Paper– Lab course VI– Software Project

- Code Design
- Report Design
- Implementation
- Testing

#### Standard Project Report Documentation Format

- a) Cover Page
- b) Institute/College Recommendation
- c) Guide Certificate
- d) Declaration
- e) Acknowledgement
- f) Index
- g) Chapter Scheme
  - 1) Introduction to Project
    - Introduction
    - Existing System
    - Need and scope of Computer System
    - Organization Profile
  - 2) Proposed System
    - Objectives
    - Requirement Engineering.
      - Requirement Gathering
      - SRS
  - 3) System Analysis
    - System Diagram
      - DFD
      - ERD
      - UML(if applicable)
  - 4) System Design
    - Database Design
    - Input Design
    - Output Design
  - 5) Implementation
    - System Requirements
      - Hardware
      - Software
    - User Guideline
    - Installation process
  - 6) Outputs-
    - Screens and Reports (with valid Data)
  - 7) Conclusion and Suggestions
    - Conclusion
    - Limitations (future enhancement)
    - Suggestion
  - 8) Bibliography:

**Note : Minimum 4 to 6 reports are essential.**