University of Pune

T.Y. B.C.A. Semester V & VI

Pattern 2008, w.e.f. 2010-11

Semester – V

Course No.	Subject Name
501	VB.NET or VB.NET Programming
502	Internet Programming and Cyber Law
503	Principals of Marketing
504	Core Java
505	Project work (VB)
506	Computer Laboratory and Practical Work (.NET + Core Java)

Semester – VI

Course No.	Subject Names
601	E-Commerce
602	Multimedia Systems
603	Introduction to Syspro And Operating Systems
604	Advance Java
605	Project Work (Banking & Finance, Cost Analysis, Financial Analysis, Payroll, EDP, ERP etc.)
606	Computer Laboratory and Practical Work (Multimedia + Advanced Java)

T.Y. B.C.A.
Semester V
Subject Name -: VB.NET or VB.NET Programming.
Course Code -: 501

Sr. No.	TOPICS	No. of Lectures	Reference Books

1.	**.NET Framework**
	(Introduction to .NET Framework)
	  1.1 Introduction
	  1.2 CLR
	  1.3 CTS
	  1.4 MSIL
	  1.5 Garbage Collection
	  1.6 Assemblies
	     1.6.1 Assembly content
	     1.6.2 Assembly types
		4	Bk 1

2.	**VB.Net Programming**
	  2.1 Windows Forms
	     2.1.1. Setting Title Bar Text
	     2.1.2. Seeing the initial position of a form
	     2.1.3. Minimizing/Maximising a form
	     2.1.4. Working with multiple forms
	     2.1.5. Setting the StartUp Form
	     2.1.6. Adding controls to a form
	     2.1.7. Setting properties at Design Time
	          Docking & Anchoring controls
	     2.1.8 Setting properties at run time
	     2.1.9 Creating a Message Box
	         - Using Msgbox Function
	         - Using MessageBox.Show Function
	     2.1.10. Creating an Input Box
	     2.1.11. Multiple Document Interface(MDI) Forms
	     2.1.12. Creating MDI Aplications
	     2.1.13. Creating a Dialog Box
	     2.1.14. Handling Events
	  2.2 Controls
	     2.2.1 Label Control
	     2.2.2 TextBox Control
	     2.2.3 Button Control
	     2.2.4 ComboBox Control
	     2.2.5 ListBox Control
	     2.2.6 CheckBox Control
	     2.2.7 RadioButton
	     2.2.8 GroupBox Control
	     2.2.9 Panel, PictureBox,ProgressBar & Timer Controls
	     2.2.10 Menus,Built-in Dialog Boxes,Treeview Controls
	  2.3 Mouse Events & Keyboard Events
	     2.3.1 Mouse Events
	        -MouseClick
	        -MouseDoubleClick
	        -MouseDown
	      -MouseEnter
	      -MouseHover
		16	Bk 1

	-MouseLeave -MouseMove -MouseUp 2.3.2 Keyboard Events -Key Press -KeyDown -KeyUp		
3.	**OOPs principles withVB.net** **(Object Oriented Programming in VB.NET)** 3.1.1Class and Object 3.1.2· Properties, methods and events. 3.1.3· Constructors and Destructors 3.1.4· Method overloading 3.1.5· Inheritance 3.1.6. Access modifiers: Public, Private, Protected, Friend. 3.1.7· Overloading and Overriding. 3.1.8· Interfaces. 3.1.9· Polymorphism.	**10**	
4.	Exception Handling 4.1 Importance of Exception Handling 4.2 Exception Handling in VB.NET 4.3 User defined exception.	**02**	Bk 01
4.	Web applications in VB .NET * Introduction to ASP **.**net 4.1.1· Creating web applications 4.1.2· Working with web forms 4.1.3· Event handling 4.1.4· Data preservation in Client and Server 4.1.5· Multiform web application 4.1.6· Embedding VB Code in web pages 4.1.7· Web forms : Buttons, Text Boxes, Labels, Check Boxes, 4.1.8Radio Buttons, Tables, 4.1.9Panels, Images, Image Buttons, List Boxes, Drop-Down Lists, Hyperlinks and Link Buttons	**08**	
5.	Databases in VB .NET 5.1.1· Database : Connections, Data adapters, and datasets 5.1.2· Connection to database with server explorer 5.1.3· Data binding with controls like Text Boxes, List Boxes, Data grid etc. 5.1.4· Navigating data source 5.1.5· Data form wizard 5.1.5· Data validation 5.1.6· Connection Objects, Command Objects, Data Adapters, DataSet Class * Introduction to C#.net * denotes no programming or coding expected	**08**	
	Total	**48**	

References:
1. VB.NET Complete Reference-Tata MacGraw Hill
2. Programming Microsoft VB.NET – Francisco Balena
3. VB.NET in 21 days –Fteven Holzner
4. Complete reference VB.NET by Jeffery_R_Shapiro

T.Y. B.C.A.
Semester V
Subject Name -: Internet Programming and Cyber Law.
Course Code -: 502

Objectives -:
1. To know & understand concepts of internet programming.
2. To learn the concept of cyber law

Unit No.	Topic	Periods
1.	**HTML** 1.1 Introduction to HTML, WWW and WC 1.2 Basic HTML Structure 1.3 Common HTML Tag 1.4 Physical and Logical HTML 1.5 Types of Images, client side and server-side Image mapping 1.6 List, Table, Frames 1.7 Embedding Audio, Video 1.8 HTML form and form elements 1.9 Introduction to HTML Front Page	7
2.	**CSS(Cascading Style Sheet)** 2.1 Introduction to style sheet 2.2 Types of style sheet 2.3 Style sheet property 2.4 Positioning with style sheet	4
3.	**JAVA Script** 3.1 Introduction to Java Script 3.2 Identifier & operator, control structure, functions 3.3 Document object model(DOM), 3.4 DOM Objects(window, navigator, history, location) 3.5 Predefined functions, numbers & string functions 3.6 Array in Java scripts 3.7 Event handling in Java script	7
4.	**Active Server Pages (ASP)** 4.1 HTTP basic 4.2 Introduction to ASP 4.3 Working with personal web server & IIS 4.4 Writing simple ASP pages, 4.5 Request & Response object 4.6 Application and session object. 4.7 global.asa 4.8 ASP & database 4.9 Error handling	10
5.	**Basic Concepts of Technology and Law** 5.1 Understanding the Technology of Internet 5.2 Scope of Cyber Laws 5.3 Cyber jurisprudence	2
6.	**Law of Digital Contracts** 6.1 The essence of Digital Contracts 6.2 The system of Digital signatures 6.3 The role and function of certifying authorities	3
7.	**Access Control**	4

	7.1	Operating system Access Controls	
	7.2	Group and Roles	
	7.3	Access Control lists	
	7.4	Unix Operating system security	
	7.5	Windows NT	
	7.6	Capabilities	
	7.7	Added features in Windows 2000	
	7.8	Granularity	
	7.9	Sandboxing and Proof-carrying code	
	7.10	Hardware protection	
	7.11	Other technical attacks	
8.	**Encryption**		**4**
	8.1	The science of cryptography	
	8.2	Symmetric and asymmetric cryptography	
	8.3	RSA Algorithm	
	8.4	Public key encryption	
	8.5	Hash Functions	
9.	**Electronic Banking**		**2**
	9.1	Banking and Bookkeeping	
	9.2	Legal recognition of digital signature	
10.	**The Cyber Crime**		**2**
	10.1	Tampering with computer source document	
	10.2	Hacking with computer system	
	10.3	At least two case studies on each topic	
		Total	**45**

Recommended Books
1. Active Server pages 3.0 in 21 days- by Techmedia
2. Complete HTML- Thomas Powell
3. HTML and JavaScript – Ivan Bayross
4. Cyber Laws – Singh Yatindra
5. Cyber Crime – Bansal S K.
6. Cyber Law – Ecommerce and M-Commerce- Ahmand Tabrez.
7. Handbook of Cyber and E-commerce Laws-Bakshi P.M and Suri R.K.
8. Cyber Law in India-Farooq Ahmad(Pioneer Books).

T.Y. B.C.A.
Semester V
Subject Name -: Principles of Marketing.
Course Code -: 503

Objectives -:
1. Articulate the essential function of business, but more especially the role of marketing activities for the firm.
2. Demonstrate an understanding, identify, and apply the concept of the marketing mix: product, pricing, promotions and distribution tactics of the firm, consumer behavior.
3. Apply the concept of marketing strategy to analyze a business case scenario and provide recommendations for the firm.

Unit No.	Topic	Periods
1.	**Introduction :** Nature and scope of marketing .importance of marketing as a business function and in the economy, marketing as concept – traditional and modern, selling vs. marketing mix ,marketing environment.	8
2.	**Product :** concept of product ,consumer and industrial goods ,product planning and development ,packaging – role and functions ,brand name and trade mark, after sales service, product life cycleconcept.	8
3.	**Price :** importance of price in the marketing mix, factors affecting price of a product/service, discounts, and rebates. consumer behavior : Nature, scope and significance of consumer behaviour, market segmentation – concept and importance bases for market segmentation .	8
4.	**Distribution channels:-** concept and role . Types of distribution channels, factors affecting choice of a distribution channel. Retailer and wholesaler, physical distribution of goods, Transportation, warehousing, inventory control, order proccessig .	8
5.	**Promotion :** method of promotion ,optimum promotion mix, advertising media their relative merits and limitations characteristics of an effective advertisement. Personal selling, publicity ,sales Promotion and public relations.	8
6.	**Marketing Organization :** concept, types – Functional organization ,product focused organization , Geographic organization .Customer Based organization ,matrix organization . organization structure for a wide customer orientation.	8
	Total	48

Recommended Books
1. Principles of marketing 12th Edition - Philip Kotler and Gary Armstrong
2. Fundamentals of Marketing –Stanton
3. Marketing Management – Rajan Saxena
4. Marketing Management –V.S. Ramaswamy and S. Namakumari
5. Analysis for Marketing Planning – Donald Lehmann &Rusell Winer ,6th ed.
6. Marketing special Indian Edition –Dhruv Grewal ,Michael Levy
7. Principle of marketing 9th edition -philip kotler and Gary Armstrong
8. Marketing Models –Lilien & kolter & Moorthy
9. Marketing Management Text And Cases in Indian Context –Dr. K.Karunakaran.
10. Marketing Management Text and cases –Biplab Bose
11. Marketing Management –S.A. sherlekar13th Edition
12. Product Management S.A Chunawala
13. Marketing Management - -Philip Kotler

T.Y. B.C.A.
Semester V

Subject Name -: Core Java.
Course Code -: 504

Objectives -:
1. To learn the basic concept of Java Programming
2. To Understand how to use programming in day to day applications

Unit No.	Topic	Periods
1.	**Introduction to Java** 1.1 Features of java 1.2 JDK Environment & tools like(java, javac, appletviewer, javadoc, jdb)	2
2.	**Object Oriented Programming Concept** 2.1 Overview of Programming 2.2 Paradigm 2.3 Classes 2.4 Abstraction 2.5 Encapsulation 2.6 Inheritance 2.7 Polymorphism 2.8 Difference between C++ and JAVA	3
3.	**Java Programming Fundamental** 3.1 Structure of java program 3.2 Data types 3.3 Variables 3.4 Operators 3.5 Keywords 3.6 Naming Convention 3.7 Decision Making (if, switch) 3.8 Looping(for, while) 3.9 Type Casting	4

4.	**Classes and Objects**
	4.1 Creating Classes and objects
	4.2 Memory allocation for objects
	4.3 Constructor
	4.4 Implementation of Inheritance
	      Simple
	      Multilevel
	      Hierarchical
	4.5 Implementation of Polymorphism
	      Method Overloading
	      Method Overriding
	4.6 Nested and Inner classes
		5

5.	**Arrays String and Vector**
	5.1 Arrays
	      Creating an array
	5.2 Types of Array
	       One Dimensional arrays
	       Two Dimensional array
	   5.3 Strings
	   5.4 String – Arrays ,String Methods, String Buffer class, Vectors
	   5.5 Wrapper classes
		4

6.	**Abstract Class , Interface and Packages**
	   6.1 Modifiers and Access Control
	       Default, public private protected
	   6.2 Abstract classes and methods
	   6.3 Interfaces
	  6.4 Packages
	      • Packages Concept
	      • Creating user defined packages
	      • Java Built in packages
	      Java.lang->math
	      Java.util->Random, Date, Hash Table
		6

7.	**Exception Handling** 7.1 Exception types 7.2 Using try catch and Multiple catch 7.3 Nested try 7.4 throw , throws and finally 7.5 Creating User defined Exceptions	**4**

8.	**File Handling**
	8.1 Byte Stream
	8.2 character stream
	8.3 file IO Basics
	8.4 File Operations
	      • Creating file
	      • Reading file(Character, byte)
	      • Writing File (Character, byte)
		3

9.	**Applet Programming** 9.1 Introduction 9.2 Types applet 9.3 Applet Life cycle 9.4 Creating applet 9.5 Applet tag	**3**

10.	**AWT and Event Handling**
	   10.1 Components used in AWT
	   10.2 AWT controls and Layout managers
	   10.3Listeners
	   10.4 Adapter classes
		8

11.	**Introduction to Swing** 11.1 Component and container 11.2 Event handling in swing	**3**
	Total	**46**

Recommended Books
1. Programming with JAVA   - E Balgurusamy
2. The Complete Reference – JAVA   Herbert Schildt

T.Y. B.C.A.
Semester VI

Subject Name -: E-Commerce.
Course Code -: 601

Objectives -:
1. To know the concept of electronic commerce
2. To Know what is Internet and Extranet
3. To know Internet marketing techniques

Unit No.	Topic	Peroids
1.	**Introduction to Electronic Commerce** 1.1 What is E-Commerce (Introduction and Definition) 1.2 Main activities E-Commerce 1.3 Goals of E-Commerce 1.4 Technical Components of E-commerce 1.5 Functions of E-commerce 1.6 Adv / Dis Adv of E-commerce 1.7 Scope of E-commerce 1.8 Electronic commerce Applications 1.9 Electronic commerce and Electronic Business (C2C)(2G , G2G , B2G , B2P,B2A,P2P, B2A, C2A, B2B,B2C)	6
2.	**Building own website** 2.1 Reasons for building own website 2.2 Benefits of website 2.3 Bandwidth requirements 2.4 Cost , Time , Reach 2.5 Registering a Domain Name 2.6 Web promotion 2.7 Target email , Baner Exchange , Shopping Bots	5
3.	**Internet and Extranet** 3.1 Definition of Internet 3.2 Adv and Dis adv of the Internet 3.3 Component of a Intranet Information technology structure 3.4 Development of a Intranet 3.5 Extranet and Intranet Difference **3.6** Role of Intranet in B2B Application	7
4.	**Electronic Data Interchange** **4.1** Introduction **4.2** Concepts of EDI and Limitation **4.3** Application of EDI **4.4** Disadvantages of EDI **4.5** EDI model	5
5.	**Electronic payment System** 5.1 Introduction 5.2 Types of Electronic payment system 5.3 Payment types 5.4 Traditional payment 5.5 Value exchange system 5.6 Credit card system 5.7 Electronic funds transfer 5.8 Paperless bill	8

	5.9 Modern payment cash 5.10 Electronic cash	
6.	**Planning for Electronic Commerce** **6.1** Planning electronic commerce initiaties **6.2** Linking objectives to business strategies **6.3** Measuring cost objectives **6.4** Comparing benefits to costs **6.5** Strategies for developing electronic commerce web sites	5
7.	**Internet Marketing** **7.1** The PROS and CONS of online shopping **7.2** The PROS and CONS of online shopping **7.3** The cons of online shopping **7.4** Justify an Internet business **7.5** Internet marketing techniques **7.6** The E-cycle of Internet marketing **7.7** Presonalisation e – Commerce	5
8.	**E- Governance for India** **8.1** E- Governance of India **8.2** Indian customer EDI system **8.3** Service centre **8.4** Imports **8.5** Exports	4
Total		45

Recommended Books
1. E-Commerce Concepts , Models , Strategies by -- G.S.V Murthy 2. E-Commerce by --Kamlesh K Bajaj and Debjani Nag 3. Electronic Commerce by --Gary P. Schneider

T.Y. B.C.A.
Semester VI

Subject Name -: Multimedia Systems
Course Code -: 602

Objectives -:
1. To know the concept of multimedia systems
2. To know different software tools used in multimedia
3. To know different file formats.

Unit No.	Topic	Periods

1.	**Introduction to Multimedia**
	1.1 What is multimedia?
	1.2 History of Multimedia systems
	1.3 Components of Multimedia Systems
	1.4 Hypertext and Hypermedia
	    1.4.1 What is Hypertext and Hypermedia
	    1.4.2 Characteristics of Hypertext and Hypermedia
	1.5 Applications of Multimedia System
		5

2.	**Multimedia Application Development**
	2.1 Introduction
	2.2 Conceptualization
	    2.2.1 Subject Matter/Theme
	    2.2.2 Target Audience
	    2.2.3 Objectives
	2.3 Story
	2.4 Flowline
	2.5 Script
	2.6 Storyboard
	    2.6.1 What is Storyboard
	    2.6.2 General Guidelines
	    2.6.3 Guidelines for Visual Elements
	    2.6.4 Guidelines for Animation
	    2.6.5 Guidelines for Text
	    2.6.6 Guidelines for Audio
	2.7 Overview of multimedia Software tools
	    2.7.1 Digital Audio
	    2.7.2 Music sequencing notations
	    2.7.3 Image/Graphics editing
	    2.7.4 Animation
		8

3.	**Digital Representation** 3.1 Analog Representation 3.2 Digital Representation 3.3 Analog to digital Conversion 3.4 Digital to Analog Conversion	4

4.	**Storage Technology**
	4.1 Magnetic Media
	    4.1.1 Hard Disk
	    4.1.2 RAID
	4.2 Optical Media
	    4.2.1 CD Storage
	    4.2.2 CD standards
	4.3 DVD
		4

	4.3.1 Sizes and Capacity of DVD 4.3.2 DVD Video 4.3.4 DVD audio	

5.	**Audio**
	5.1 Basics of Digital Audio
	    5.1.1 What is Sound?
	    5.1.2 Characteristics of Sound
	    5.2.3 Digital Audio
	5.2 Synthesizers
	    4.2.1 Types of Synthesizers
	    4.2.2 Characteristics of Synthesizers
	5.3 Introduction to MIDI
	    5.3.1 What is MIDI
	    5.3.2 Components of MIDI
	    5.3.3 MIDI Messages
	    5.3.4 Channel Messages
	    5.3.5 System Messages
	    5.3.6 General MIDI
	5.4 Sound Card
	    5.4.1 Basic Components
	    5.4.2 I/O Ports
	    5.4.3 Processing Audio Files
	      - Wav files
	      - MIDI files
		8

6.	**Video**
	6.1 Basics of Video
	6.2 Video Signal Formats
	    6.2.1 Component Video
	    6.2.2 Composite Video
	    6.2.3 S-Video
	6.3 Television Broadcasting Standards
	    6.3.1 NTSC
	    6.3.2 PAL
	    6.3.3 SECAM
	6.4 Digital Video
	6.5 Digital Video Standards
	    6.5.1 EDTV
	    6.5.2 CCIR Recommendations
	   6.5.3 HD Video and HDTV
		8

7.	**Graphics File Format**
	7.1 Graphics/ Image Data Structure
	    7.1.1 8-bit color image
	    7.1.2 24-bit color image
	7.2 Standard System Independent Formats
	    7.2.1 GIF
	    7.2.2 TIFF
	    7.2.3 JPEG
	7.3 System Dependent Formats
	    7.3.1 Microsoft Windows : BMP
	    7.3.2 Macintosh : PAINT and PICT
	    7.3.3 X-Windows : XBM
		7

	Total	**45**

Recommended Books
1. Principles of Multimedia – Ranjan Parekh
2. Multimedia Systems Design – Prabhat K. Andleigh and Kiran Thakrar

T. Y. B. C. A.
Semester VI
Subject Name -: Introduction to System Programming and Operating System.
Course Code -: 603

Objective / Objectives -:
1. To know system programming
2. To know services provided by operating system
3. To know the Scheduling concepts

Unit No.	Topic	Periods
1.	**Introduction to System Program** Introduction (Types and comparison of types of software) Components of System Programming (Definitions only) Assemblers Loaders Macros Compilers and Interpreters Editors Debuggers	3
2.	**Introduction to Operating System** Definition of operating system Services provided by OS Types of OS System Calls Process or job control Device Management File Management Information Maintenance Communication System call implementation System Program	3

3.	**Process Management**
	Process Concept
	   3.1.1 Process State
	   3.1.2 Process Control Block
	Context Switch
	3.3 Operation on Process
	   3.3.1 Process Creation
	   3.3.2 Process Termination
		3

4.	**CPU Scheduling** Introduction Scheduling Concepts CPU- I/O Burst Cycle CPU Scheduler Preemptive and Non-preemptive scheduling Dispatcher Scheduling criteria (terminologies used in scheduling)	7

	• Scheduling Algorithms
	  ○ FCFS
	  ○ SJF (Preemptive & non-preemptive)
	  ○ Priority Scheduling (Preemptive & nonpreemptive)
	  ○ Round Robin Scheduling
	  ○ Multilevel Queues
	  ○ Multilevel Feedback queues		

5.	**Process Synchronization**
	• Introduction
	• Critical section problem
	• Semaphores
	  ○ Concept
	  ○ Implementation
	  ○ Deadlock & Starvation
	  ○ Binary Semaphores
	• Classical Problems of synchronization
	  ○ Bounded buffer problem
	  ○ Readers & writers problem
	  ○ Dining Philosophers problem
	• Critical Sections
		6	

6.	**Deadlocks**
	• Introduction
	• Deadlock Characterization
	  ○ Necessary Condition
	  ○ Resource allocation graph
	• Deadlock Prevention
	• Deadlock Avoidance
	  ○ Safe State
	  ○ Resource allocation graph algorithm
	  ○ Bankers algorithm
	• Deadlock Detection
	• Recovery from deadlock
	  ○ Process Termination
	  ○ Resource Preemption
		7	

7.	**Memory Management**
	• Introduction to memory management
	• Address Binding
	    7.1.2 Dynamic Loading
	    7.1.3 Dynamic Linking
	    7.1.4 Overlays
	• Logical vs. physical addresses
	• Swapping
	• Contiguous memory allocation
	    7.4.1 Single Partition Allocation
	    7.4.2 Multiple Partition Allocation
	    7.4.3 External and Internal Fragmentation
	7.5 Paging
	• Segmentation
	• Segmentation with paging
	• Virtual memory
	• Demand paging
	• Page replacement algorithms
	  ○ FIFO
	  ○ MRU
	  ○ LRU
	  ○ LRU approximation using reference bit
	  ○ MFU
		8	

	˜₁LFU		
	˜₁Second Chance algorithm		
	˜₁Optimal replacement		
8.	**File System**		**4**
	˜₁Introduction & File concepts (file attributes, operations on files)		
	˜ Access methods		
	˜ ˜₁Sequential access		
	˜ ˜ Direct access		
	˜ File structure		
	˜ Allocation methods		
	˜ ˜₁Contiguous allocation		
	˜ ˜ Linked Allocation		
	˜ ˜ Indexed Allocation		
	˜ Free Space Management		
	8.5.1 Bit Vector		
	8.5.2 Linked List		
	8.5.3 Grouping		
	8.5.4 Counting		
9.	**I/O System**		**4**
	9.1 Introduction		
	9.2 I/O Hardware		
	9.3 Application of I/O Interface		
	9.4 Kernel I/O Subsystem		
	9.5 Disk Scheduling		
	9.5.1 FCFS		
	9.5.2 Shortest Seek time first		
	9.5.3 SCAN		
	9.5.4 C- SCAN		
	9.5.5 LOOK		
		Total	**45**

Recommended Books
1. System Programming and Operating System – D. M. Dhamdhere
2. Operating System Concepts – Silberschatz, Galvin, Gagne

T. Y. B. C. A.

Semester VI

Subject Name -: Advance Java
Course Code -: 604

Objectives -:
1. To know the concept of Java Programming
2. To Understand how to use programming in day to day applications
3. To develop programming logic

Unit No.	Topic	Periods
1.	**JDBC** 1.1 The design of JDBC 1.2 Basic JDBS program Concept 1.3 Drivers 1.4 Making the Connection, Statement , ResultSet 1.5 Executing SQL commands 1.6 Executing queries	6
2.	**MultiThreading** 2.1 Threading basics 2.2 Life cycle of thread 2.3 Creating Threads 2.4 Priorities and Synchronization 2.5 Inter Thread Communication 2.6 Runnable Interface	6
3.	**Collection Framework** 3.1 Collection Interface List , sets 3.2 Sorted set 3.3 Collection classes 3.4 Linked list 3.5 Array list 3.6 Vectors 3.7 Hash set 3.8 Tree set 3.9 Using Iterators and enumerations 3.10 Working with maps 3.11 Map interfaces 3.12 Map classes	8
4.	**Servlet** 4.1 Introduction 4.2 Life cycle of servlet 4.3 Types of servlet 4.4 Session Tracking 4.5 Cookie class 4.6 Servlet- Jdbc	7
5.	**Remote Method Invocation** 5.1 Introduction to remote object 5.2 RMI architecture 5.3 Stubs and skeleton 5.4 Registry 5.5 Setting up RMI 5.6 Using RMI with applet	7
6.	**Introduction to JSP** 7.1 Components of JSP – Directives , Tags, Scripting Elements	6

	7.2 Building a simple application using JSP	
7.	**Java Beans** 6.1 What is bean 6.2 Advantages 6.3 Using Bean Development kit(BDK) 6.4 Introduction to jar and manifest files 6.5 The java beans API	**6**
	Total	**46**

Recommended Books
1.   The Complete Reference – JAVA   Herbert Schildt
2.   Core java –II By Cay S. Horstmann and Gary Cornell
3.   Compete Reference J2EE – Jim Keogh