KUVEMPU UNIVERSITY

Syllabus for Bachelor of Science in Computer Science

(B.Sc – V & VI Semester)

NEP-2020

Under Graduate Board of Studies

In

COMPUTER SCIENCE

w.e.f Academic Year 2023-24 onwards

Curriculum Design/Syllabus Framing Committee

Sl. No.	Name	Designation
1.	**Dr. Suresha M** Associate Professor, Department of P.G Studies and Research in Computer Science, Kuvempu University, Shankaraghatta – 577541, Shimoga(D).	**Chairman**
2.	**Dr. Shoieb Ahamed** Assistant Professor, Department of Computer Science, Government First Grade College, Sorab – 577429, Shimoga(D).	**Member**
3.	**Mr. Shashidhara B** Assistant Professor, Department of Computer Science, IDSG College,Chikkamagaluru – 577101.	**Member**
4.	**Mr. Gopala B** Assistant Professor, Department of Computer Science, Government First Grade College Shikaripura-577427, Shimoga(D).	**Member**
5.	**Mr. Krishnamurthy K** Assistant Professor, Department of Computer Science, Government First Grade College, Thirthahalli -577432, Shimoga(D).	**Member**
6.	**Mr. Prajwal Kumar P** Assistant Professor, Department of Computer Science, Government First Grade College, Kadur – 577548.	**Member**

Curriculum Structure for B.Sc (Cs)

Program: B.Sc   **Subject: Computer Science**

Semester	CourseNo.	Theory/Practical	Credits	Teaching Hours per week (L+T+P)	PaperTitle	Marks	
						S.A.	I.A.
V	DSC5	Theory	4	4+0+0	Programming in Python	60	40
	DSC5-Lab	Practical	2	0+0+4	Python Programming Lab	25	25
	DSC6	Theory	4	4+0+0	Computer Networks	60	40
	DSC6-Lab	Practical	2	0+0+4	Computer Networks Lab	25	25
	SEC-4	Theory/Practical	2	1+0+2	Cyber Security	25	25
VI	DSC7	Theory	4	4+0+0	Web Technologies	60	40
	DSC7-Lab	Practical	2	0+0+4	Web Technologies Lab	25	25
	DSC8	Theory	4	4+0+0	Operating System Concepts	60	40
	DSC8-Lab	Practical	2	0+0+4	Project lab	25	25
	SEC-5	Theory/Practical	2	1+0+2	Logical Reasoning	25	25

Program Name	**B.Sc.**		Semester	**V**
Course Title	**Programming in Python (Theory)**			
Course Code:	**DSC5**		No. of Credits	**04**
Contact hours	**52 Hours /4 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks		**40**	Summative Assessment Marks	**60**

Contents	52 Hrs
Introduction : Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. **Python Basics:** Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. **Python Control Flow:** Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions.	10
Python Functions: Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions. **Strings:** Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.	10
Lists: Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. **Dictionaries:** Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. **Tuples and Sets:** Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods.	10
File Handling: File Types; Operations on Files– Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator. **Exception Handling:** Types of Errors; Exceptions; Exception Handling using try, except and finally.	10
Object Oriented Programming: Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading. **GU Interface:** The Tkinter Module; Window and Widgets; Layout Management- pack, grid and place. **Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; **Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.	12

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Assessment Test 1	10 Marks
Internal Assessment Test 2	10 Marks
Quiz/ Assignment/ Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

References	
1	**Think Python How to Think Like a Computer Scientist,** Allen Downey et al., 2nd Edition, 2015, Green Tea Press. Freely available online @ https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
2	**Introduction to Python Programming**, Gowrishankar S et al.,2019, CRC Press
3	**Python Data Analytics**: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, 2015, Apress®
4	**Advance Core Python Programming**, Meenu Kohli, 2021, BPB Publications
5	**Core PYTHON Applications Programming**, Wesley J. Chun, 3rd Edition, 2012, Prentice Hall
6	**Automate the Boring Stuff**, Al Sweigart, 2015, No Starch Press, Inc.
7	**Data Structures and Program Design Using Python**, D Malhotra et al., 2021, Mercury Learning and Information LLC
8	http://www.ibiblio.org/g2swap/byteofpython/read/
9	https://docs.python.org/3/tutorial/index.html

Course Title	**Python Programming Lab (Practical)**	Practical Credits	**02**
Course Code	**DSC5-Lab**	Contact Hours	**04 Hours**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Practical Content

Part-A
1. Check if a number belongs to the Fibonacci Sequence
2. Find the sum of n natural numbers
3. Display Multiplication Tables
4. Check if a given number is a Prime Number or not
5. Implement a sequential search
6. Create a calculator program
7. Explore string functions
8. Implement Selection Sort
9. Read and write into a file

Part-B
1. Demonstrate usage of basic regular expression
2. Demonstrate use of advanced regular expressions for data validation.
3. Demonstrate use of List
4. Demonstrate use of Dictionaries
5. Create SQLite Database and Perform Operations on Tables
6. Create a GUI using Tkinter module
7. Demonstrate Exceptions in Python
8. Drawing Line chart and Bar chart using Matplotlib
9. Drawing Histogram and Pie chart using Matplotlib

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Write two Programs one from Each Part	10 Marks
Execution (Any one)	10 Marks
Viva	5 Marks
Total	**25 Marks**

References	
1	**Think Python How to Think Like a Computer Scientist,** Allen Downey et al., 2nd Edition, 2015, Green Tea Press. Freely available online @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
2	**Introduction to Python Programming**, Gowrishankar S et al.,2019, CRC Press
3	**Python Data Analytics**: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, 2015, Apress®
4	**Advance Core Python Programming**, Meenu Kohli, 2021, BPB Publications
5	**Core PYTHON Applications Programming**, Wesley J. Chun, 3rd Edition, 2012, Prentice Hall
6	**Automate the Boring Stuff**, Al Sweigart, 2015, No Starch Press, Inc.
7	http://www.ibiblio.org/g2swap/byteofpython/read/

Program Name	**B.Sc.**		Semester	**V**
Course Title	**Computer Networks (Theory)**			
Course Code:	**DSC6**		No. of Credits	**04**
Contact hours	**52 Hours/ 4 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks		**40**	Summative Assessment Marks	**60**

Contents	**52 Hrs**
Introduction: Computer Network: Definition, Goals, Structure; Broadcast and Point-To-Point Networks; Network Topology and their various Types; Types of Network, Network software, Design issues for the layers, Connection-oriented vs. Connection-less service, Applications of Computer network, Protocols and Standards, The OSI Reference Model, The TCP/IP Protocol suite, Comparison between OSI and TCP/IP Reference model.	12
Physical Layer: Functions of Physical Layer**,** Analog signals, Digital signals, Transmission Impairment, Data Rate Limits, and Performance. Data Transmission Media: Guided Transmission Media, Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Wireless Transmission, Digital Modulation and Multiplexing, Public Switched Telephone Networks. Switching: Circuit switching, Message switching & Packet switching	10
Data Link Layer: Functions of Data Link Layer, Data Link Control: Framing, Flow and Error Control, Error Detection and Correction, High-Level Data Link Control (HDLC) & point — to — Point protocol(PPP), Channel Allocation Problem, Multiple Access: Radom Access(ALOHA, CSMA, CSMA/CD, CSMA/CA), Controlled Access(Reservation, Polling, Token Passing).	10
Wired and Wireless LAN: Ethernet Standards and FDDI, Wireless LAN: IEEE 802.1 Ix and BluetoothStandards. **Transport Layer:** Functions of Transport Layer, Elements of Transport Protocols: Addressing, Establishing and Releasing Connection, Flow Control & Buffering, Error Control, Multiplexing & De-multiplexing, Crash Recovery,	10
User Datagram Protocol (UDP): User Datagram, UDP Operations, Uses of UDP, RPC, Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol,Pipelined Reliable Data Transfer Protocol, Go Back-N(GBN), Selective Repeat(SR). **Application layer :** Functions of Application layer, Application Layer Protocols: DNS, DHCP, WWW, HTTP, HTTPs, TELNET, FTP, SMTP, POP, IIMAP	10

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Assessment Test 1	10 Marks
Internal Assessment Test 2	10 Marks
Quiz/ Assignment/ Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

Course Title	**Computer Networks Laboratory (Practical)**	Practical Credits	**02**
Course Code	**DSC6 Lab**	Contact Hours	**04 Hours**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Practical Content

Part A:

1. Prepare hardware and software specification for basic computer system and Networking.
2. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
3. Identifying the networking devices on a network.
4. Configure the IP address of the computer.
5. Create a basic network and share file and folders.
6. Study of basic network command and Network configuration commands.
7. Installation process of any open source network simulation software.

Part B:

1. Implement connecting two nodes using network simulator.
2. Implement connecting three nodes considering one node as a central node using network simulator. Implement a network to connect three nodes considering one node as a central node using network simulator.
3. Implement bus topology using network simulator.
4. Implement star topology using network simulator.
5. Implement ring topology using network simulator.
6. Demonstrate the use of wireless LAN using network simulator.
7. Implement FTP using TCP bulk transfer using network simulator.

Links for open source simulation software:
o **NS3 software: https://www.nsnam.org/releases/ns-3-30/download/**
o **Packet Tracer Software: https://www.netacad.com/courses/packet-tracer**
o **GNS3 software: https://www.gns3.com/**

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Write two Programs one from Each Part	10 Marks
Execution (Any one)	10 Marks
Viva	5 Marks
Total	**25 Marks**

References	
Reference Books:	
1	Andrew S Tanenbaum, David. J. Wetherall, ‒Computer Networks‖, Pearson Education, 5th Edition,
2	Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, Fourth Edition
3	Kurose and Ross, Computer Networking- A Top-Down approach, Pearson, 5th edition
4	William Stallings, Data and Computer Communications, 7th Edition,PHI.
4	http://highered.mheducation.com/sites/0072967757/index.html
7	Larry L. Peterson, Bruce S. Davie, ‒Computer Networks: A Systems Approach‖, Morgan Kaufmann Publishers, Fifth Edition, 2011.
8	Brijendrasingh, Data Communication and Computer Networks,PHI.

Program Name	**B.C.A**		Semester	**VI**
Course Title	**Cyber Security(Theory)**			
Course Code:	**SEC-4**		No. of Credits	**02**
Contact hours	**30 Hrs /3 Hours per week**		Duration of SEA/Exam	**01 hrs**
Formative Assessment Marks		**25**	Summative Assessment Marks	**25**

Contents	30 Hrs
Module-I. Introduction to Cyber security: Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept ofcyber security, Issues and challenges of cyber security.	10
Module-II . Cyber crime and Cyber law: Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organisations dealing with Cyber crime and Cyber security in India.	10
Module III. Social Media Overview and Security: Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media.	10

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Test 1	10 Marks
Assignment / Surprise Test/	15 Marks
Total	**25 Marks**

References	
1	Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010
2	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3	Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4	Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
5	Fundamentals of Network Security by E. Maiwald, McGraw Hill.
6	Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.

Program Name	**B.Sc.**		Semester	**VI**
Course Title	**Web Technologies (Theory)**			
Course Code:	**DSC7**		No. of Credits	**04**
Contact hours	**52 Hours /4 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks		**40**	Summative Assessment Marks	**60**

Contents	52 Hrs
Introduction to Web Design: Introduction to Internet, WWW and Web 2.0,Web browsers, Web protocols and Web servers, Web Design Principles and Web site structure, client-server technologies, Client side tools and technologies, Server side Scripting, URL, MIME, search engine, web server- Apache, IIS, proxy server, HTTP protocol. Introductionsto HTML. HTML5 Basics tags, Formatting tags in HTML, HTML5 Page layout and Navigation concepts,Semantic Elements in HTML, List, type of list tags, tables and form tags in HTML,multimedia basics, images, iframe, map tag, embedding audio and video clips on web page.	11
Introduction to XML: XML Syntax, XML Tree, Elements, Attributes, Namespace, Parser,XSLT DOM, DTD, Schema. Introduction to CSS, CSS syntax, CSS selectors, CSSBackground Cursor, CSS text fonts, CSS-List Tables, CSS Box Modeling, DisplayPositioning, Floats, CSS Gradients, Shadows, 2D and 3D Transform, Transitions, CSS Animations.	10
Introduction to JavaScript: JavaScript Data type and Variables, JavaScript Operators,Conditional Statements, Looping Statements, JavaScript Functions, Number, Strings, Arrays,Objects in JavaScript, Window and Frame objects, Event Handling in JavaScript, Exception Handling, Form Object and DOM, JSON, Browser Object Model.	11
Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlets, deploying a Servlets, The Servlets API, Reading Servlets parameters, reading initialization parameters, Handling HTTP Request & Responses, Using Cookies and sessions, connectingto a database using JDBC.	10
Web Security: Authentication Techniques, Design Flaws in Authentication,Implementation Flaws in Authentication, Securing Authentication, Path Traversal Attacks. Injecting into Interpreted Contexts, SQL Injection, NoSQL Injection, XPath Injection, LDAP Injection, XML Injection, HTTP Injection, Mail Service Injection. Types of XSS, XSS in Real World, Finding and Exploiting XSS Vulnerabilities, Preventing XSS Attacks.	10

Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Internal Assessment Test 1	10 Marks
Internal Assessment Test 2	10 Marks
Quiz/ Assignment/ Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

References	
1	Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dremtech
2	Java Server Pages – Hans Bergsten, SPD O'Reilly
3	Java Script, D.Flanagan, O'Reilly, SPD
4	Beginning Web Programming-Jon Duckett WROX.
5	Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
6	Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

Program Name	**B.Sc.**		Semester	**VI**
Course Title	**Web Technologies Lab**			
Course Code:	**DSC7-Lab**		No. of Credits	**02**
Contact hours	**04 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks		**25**	Summative Assessment Marks	**25**

Part A

1. Design web pages for your college containing college name and Logo, departments list using href, list tags.
2. Create a class timetable using table tag.
3. Write a HTML code to design Student registrations form for your college Admission
4. Design Web Pages with includes Multi-Media data (Image, Audio, Video, GIFs etc)
5. Create a web page using frame.
6. Write code in HTML to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
7. Write CSS code to Use Inline CSS to format your ID Card.

Part B

1. Write a JavaScript Program to perform Basic Arithmetic operations
2. JavaScript Program to Check Prime Number
3. JavaScript Program to implement Javascript Object Concept
4. JavaScript Program to Create Array and inserting Data into Array
5. JavaScript Program to Validate an Email Address
6. Write a Program for printing System Date & Time using SERVLET
7. Write a server side SERVLET program for accept number from HTML file and Display.

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Write two Programs one from Each Part	10 Marks
Execution (Any one)	10 Marks
Viva	5 Marks
Total	**25 Marks**

Program Name	**B.Sc.**		Semester	**VI**
Course Title	**Operating System (Theory)**			
Course Code:	**DSC8**		No. of Credits	**04**
Contact hours	**52 Hours/4 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Contents	52 Hrs
INTRODUCTION TO OPERATING SYSTEM: What Operating Systems Do? Computer -System organization; Computer-System Architecture; Operating-System Operations; Operating-System Services;User and Operating-System Interface; System Calls; System Services	12
PROCESS MANAGEMENT: Process Concept; Process scheduling; Operations on Processes; Inter process communication; IPC in Shared- Memory Systems; IPC in Message-Passing Systems..	12
CPU SCHEDULING: Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Real-Time CPU Scheduling. PROCESS SYNCHRONIZATION: Critical Section Problem and Peterson's Solution; Semaphores; Monitors; Classic Problems of Synchronization; Synchronization within the Kernel.	8
DEADLOCKS: System Model; Deadlocks Characterization; Methods for Handling Deadlocks; Deadlock Prevention; Deadlock Avoidance; Deadlock Detection	10
MEMORY MANAGEMENT: Contiguous Memory Allocation; Paging;Structure of the Page Table; Swapping.	8

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Assessment Test 1	10 Marks
Internal Assessment Test 2	10 Marks
Quiz/ Assignment/ Small Project	10 Marks
Seminar	10 Marks
Total	**40 Marks**

References	
1	Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne8 th Edition, Wiley, 2009.
2	Operating Systems - Internals and Design Principles, William Stallings, 9th Edition,Pearson.
3	Operating Systems – A Concept Based Approach, Dhamdhere, 3rd Edition, McGrawHill Education India.
4	Modern Operating Systems, Andrew S Tanenbaum, 4th Edition, Pearson.

Program Name	**B.Sc.**		Semester	**VI**
Course Title	**Project Lab**			
Course Code:	**DSC8 Lab**		No. of Credits	**02**
Contact hours	**04 Hours per week**		Duration of SEA/Exam	**2 hours**
Formative Assessment Marks		**25**	Summative Assessment Marks	**25**

Guidelines :-
1. The project is of **4 hours per week** for one (semester VI) semester duration
2. The synopsis approval will be given by the project Guides .
3. The Project work should be either an individual (one) or a group of not more than five members.
4. project labs will focused on survey, planning, designing, coding and testing of the project.

Report :
The project proposal should include the following:
● Title
● Introduction
● Litrature survy
● Objectives
● Design Details of modules and process logic
● Developement/Implementation stages
● Testing Report
● Results

Internal Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal /Attendance / documentation/developemnt work/ Report/	25 Marks
Total	**25 Marks**

Formative Assessment for Practical	
Assessment Occasion/ type	**Marks**
Demo - Presentation	10 Marks
Report	10 Marks
Viva	5 Marks
Total	**25 Marks**

Program Name	**B.Sc.**		Semester	**VI**
Course Title	**Logical Reasoning (Theory)**			
Course Code:	**SEC-5**		No. of Credits	**02**
Contact hours	**30 Hrs /3 Hrs per week**		Duration of SEA/Exam	**01 hrs**
Formative Assessment Marks		**25**	Summative Assessment Marks	**25**

Contents	30 Hrs
Arithmetic Reasoning: Analytical Thinking, Syllogistic Logic, Problem solving; Number System; LCM &HCF; Divisibility Test; Surds and Indices; Logarithms; Ratio, Proportions and Variations; Partnership; Time speed and distance; work time problems;	10
Data Interpretation: Numerical Data Tables; Line Graphs; Bar Charts and Pie charts; Mix Diagrams; Geometrical Diagrams, and other forms of Data Representation	10
Lateral Thinking, Reasoning & Logic: Verbal and Non-verbal Logic, Family Tree; Linear Arrangements; Circular and Complex Arrangement; Conditionality and Grouping; Sequencing and Scheduling; Selections; Networks; Venn Diagram in Logical Reasoning.	10

Formative Assessment for Theory	
Assessment Occasion/ type	**Marks**
Internal Test 1	10 Marks
Assignment / Surprise Test/	15 Marks
Total	**25 Marks**
Formative Assessment as per guidelines.	

References	
1	R.S.Aggarwal- -A Modern Approach to Verbal and Non–Verbal Reasoning‖ Sultan Chand and Sons, New Delhi
2	R.S.Aggarwal—Quantitative Aptitude‖, Sultan Chand and Sons, New Delhi
3	Dr.Ravi Chopra – -Verbal and Non–Verbal Reasoning‖, MacMillan India
4	Dr.Edward DeBono – -Lateral Thinking‖, Penguin Books, New Delhi