

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of teaching and examination

B.E. IV Semester Computer Science & Engineering

S.No	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of exam			Total Marks	Credit L+(T+P) / 2
				L	T	P	Theory/Practical				
							ESE	CT	TA		
1	Appl. Mathematics	322411(14)	Computational Mathematics	4	1		80	20	20	120	5
2	Appl. Mathematics	322412(14)	Discrete Structures	3	1		80	20	20	120	4
3	Comp Science & Engg	322413(22)	Data Structures	3	1		80	20	20	120	4
4	Comp Science & Engg	322414(22)	Computer Systems Architecture	3	1		80	20	20	120	4
5	Comp Science & Engg	322415(22)	Object Oriented Concepts & Programming using C++	3	1		80	20	20	120	4
6	Management	322416(36)	Principles of Management	3	1		80	20	20	120	4
7	Comp Science & Engg	322421(22)	Data Structures Lab			3	40		20	60	2
8	Comp Science & Engg	322422(22)	Computer Hardware Simulation Lab			3	40		20	60	2
9	Comp Science & Engg	322423(22)	Object Oriented concepts Programming using C++ Lab			3	40		20	60	2
10	Comp Science & Engg	322424(22)	Software Technology Lab - 1			3	40		20	60	2
11	Humanities	300425(46)	Health Hygiene and Yoga			2			40	40	1
12			Library			1					
			TOTAL	19	6	15	640	120	240	1000	34

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test,TA- Teacher's Assessment

Note (1) : Duration of all theory papers will be of **Three Hours**.

Note (2) : Industrial Training of six weeks is mandatory for B.E. student . It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V sem.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C. G.)**

Semester: **B.E. 4th Sem.**

Subject: **Computational Mathematics**

Total Theory Periods: **40**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **02**

Branch: **Computer Science & Engg.**

Code: 322411 (14)

Total Tutorial Periods: **10**

UNIT- 1 NUMERICAL SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

(No. of periods 8+2)

Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Birge-Vieta Method, Bairstow's Method.

UNIT- 2 NUMERICAL SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS

(No. of periods 8+2)

Direct Methods - Gauss Elimination, Gauss-Jordan & Crout's Triangularisation Method.
Iterative Methods - Jacobi's, Gauss- Siedal & Successive Over Relaxation Method.

UNIT - 3 INTERPOLATION WITH EQUAL AND UNEQUAL INTERVALS

(No. of periods 8+2)

Finite differences, Newton's Forward & Backward Difference Formulae, Central Difference Formula, Stirling's Formula, Bessel's Formula, Lagrange's Formula and Newton's Divided Difference Formula,

UNIT - 4 NUMERICAL DIFFERENTIATION AND INTEGRATION

(No. of periods 8+2)

Derivatives using Forward, Backward and Central Difference Formulae.
Newton-Cote's Quadrature Formula, Trapezoidal rule, Simpson's rules, Weddle's rule.

UNIT - 5 NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

(No. of periods 8+2)

Picard's Method, Taylor's Series Method, Euler's Method, Euler's Modified Method, Runge-Kutta Methods, Predictor-corrector Methods- Milne's Method, Adams-Bashforth Method.

TEXT BOOKS:

1. Numerical Methods in Engineering and Science by Dr. B.S. Grewal, Khanna Publishers.
2. Numerical Methods for Scientific and Engineering Computation by M .K. Jain, S. R. K. Iyengar & R. K. Jain, Wiley Eastern Limited.

REFERENCE BOOKS:

1. Numerical Methods for Scientists and Engineers by K. Shankar Rao, Prentice Hall of India.
2. Numerical Methods with C++ Programming, by Somasundaram & Chandrasekaran, Prentice Hall of India.
3. Numerical Methods, by S. S. Shastry, Prentice Hall Inc. India 1998.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C. G.)**

Semester: **B.E. 4th Sem.**

Branch: **Computer Science & Engg.**

Subject: Discrete Structures

Code: 322412 (14)

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **02**

UNIT – 1 MATHEMATICAL LOGIC & BOOLEAN ALGEBRA (No. of periods 8+2)

Basic concept of mathematical logic, Statements, Connectives, Conditional and biconditional statements, Logical equivalence, Logical implication & quantifiers, Basic concept of Boolean Algebra, Properties of Boolean Algebra, Boolean functions, Disjunctive & conjunctive normal forms of Boolean functions, Applications of Boolean Algebra in switching circuits & logic circuits.

UNIT – 2 SET THEORY, RELATIONS, FUNCTIONS (No. of periods 8+2)

Basic concept of set theory, Relations, Properties of relation in a set, Equivalence relation, Composition of relations, Partial order & total order relations, Lattices & Hasse diagram, Introduction to function, Inverse, Identity, Injective, Surjective & Bijective functions, Composition of functions and some special functions.

UNIT – 3 ALGEBRAIC STRUCTURES (No. of periods 8+2)

Groups, Subgroups, Cosets, Lagrange's theorem, Isomorphism, Automorphism, Homomorphism, Codes & group codes, Rings, Integral domains and Fields.

UNIT – 4 GRAPH THEORY (No. of periods 8+2)

Introduction to graph theory, Walks, Paths & Circuits, Types of graphs, Shortest path problems, Eulerian and Hamiltonian graphs, Basic concept of tree: spanning tree, minimum spanning tree, search tree, rooted binary tree, Cut sets, Network flow, Matrix representation of graphs.

UNIT – 5 COMBINATORICS (No. of periods 8+2)

Permutation and combination, Pigeon-hole principle, Mathematical induction, Principle of Inclusion and Exclusion, Generating function, Recurrence relation.

TEXT BOOKS: -

1. Elements of discrete mathematics by C.L. Liu, Tata McGraw-Hill, publications.
2. Discrete Mathematical structures, by Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, Pearson Education.

REFERENCE BOOKS: -

1. A Text Book of Discrete Mathematics, Swapan Kumar Sarkar, S. Chand & Company Ltd.
2. Graph theory with applications to engineering and computer science, by Narsingh Deo, Prentice Hall of India.
3. Discrete mathematics for computer scientists and mathematicians, by J.L. Mott, A. Kandel and T.P. Baker, Prentice Hall of India.
4. Discrete Mathematical Structures with applications to computer science, by J.P. Tremblay and R. Manohar, Tata McGraw-Hill.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C.G.)**

Semester: **IV**

Branch: **Computer Science & Engineering**

Subject: **Data Structures**

Code: **322413 (22)**

Total Theory Periods: **40**

Total Tut Periods: **10**

Total Marks in End Semester Exam: **80**

Maximum number of Class Tests to be conducted: **02**

Unit –1 Simple Linear Data Structure Array

Representation of Linear Arrays in Memory, Traversing Linear Array, Inserting and Deleting, Searching: Linear and Binary, Sorting : Bubble, Selection, Insertion, Quick, Merge, Heap. Polynomial Addition, Representation of Multidimensional Array in memory, Representation of Sparse Matrices and its Transpose Algorithm.

Unit-2 Linear Linked List

Singly Linked List: Representation in Memory, Traversing, Searching, Memory Allocation, Garbage Collection, Insertion into a linked list, Deletion from a linked list, Header Linked List, Polynomial Addition, Circular Linked List, Operations on Doubly Linked List : traversing, Searching, Deleting, Inserting.

Unit-3 Stack, Queue and Recursion

Stacks: Array Representation, Linked Representation, Arithmetic Expression, Polish Notation, Recursion, Towers of Hanoi, Queues: Array Representation, Circular Queues, Linked Representation, D-Queues, Priority Queues.

Unit-4 Non-Linear Data Structure Graphs

Binary Trees, Representation of binary Trees in Memory, Traversing binary trees, Traversal algorithm using stacks, Header nodes, Threads, Binary search trees, Searching, Inserting and Deleting in a binary search trees, AVL search tree, Insertion and Deletion in an AVL search Tree, m-way search tree, Searching Insertion and Deletion in an m-way search tree, Searching, Insertion and Deletion in a B- tree.

Unit-5 Non-Linear Data Structure Graphs

Graph theory terminology, Sequential Representation of Graphs, Adjancy Matrix, Path Matrix, Warshall's algorithm, Shortest Paths, Linked Representation of a Graph, Operations on Graph, Traversing on Graphs, Posets, Topological Sorting.

Name of Text Books :

1. Data Structure by Seymour Lipschutz & G. a. Vijayalaksmi Pai (Schaum's outlines)
2. Data Structures using C/C++ by Langsam, Augenstein & Tananbaum (PHI)
3. Data Structures & Program Design by Robert L Kruse (PHI)

Name of Reference books :

1. An Introduction to Data Structures with Application by Tremblay & Sorenson (Tata Mc)
2. Data Structures using C by ISRD Group (Tata Mc)
3. Classic Data Structure by D Samanata, Prentice-Hall of India
4. Expert Data Structures with C (2nd Editin) by R.B. Patel , Khanna Publishing House.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C.G.)**

Semester: **IV**

Branch: **Computer Science & Engineering**

Subject: **Computer Systems Architecture**

Code: **322414 (22)**

Total Theory Periods: **40**

Total Tut Periods: **10**

Total Marks in End Semester Exam: **80**

Maximum number of Class Tests to be conducted: **2**

Unit 1: Processor Basics

CPU Organization, Fundamental and features, Data Representation formats, Fixed and Floating point representation, Instruction Sets, Formats, Types and Programming Considerations.

Unit 2: Datapath Design

Fixed-Point Arithmetic, Combinational ALU and Sequential ALU, Floating point arithmetic and Advanced topics, Hardware Algorithm – Multiplication, Division.

Unit 3: Control Design

Basic Concepts, Hardwired control, Microprogrammed Control, CPU control unit and Multiplier control unit, Pipeline Control.

Unit 4: Memory Organization

Memory device characteristics, RAM technology and Serial access memories technology, Multilevel memory systems, Address translation and Memory allocation systems, Caches memory.

Unit 5: System Organization

Programmed I/O , DMA, Interrupts and IO Processors, Processor-level Parallelism, Multiprocessor and Fault tolerance system.

Name of Text Books

1. Computer Architecture and organization – John P Hayes, McGraw Hill Publication
2. Computer Organizations and Design- P. Pal Chaudhari, Prentice-Hall of India

Name of reference Books:

1. Computer System Architecture - M. Morris Mano, PHI.
2. Computer Organization and Architecture- William Stallings, Prentice-Hall of India
3. Architecture of Computer Hardware and System Software: An Information Technology Approach, 3rd Edition (Illustrated) – Iry Englander, John Wiley & Sons Inc
4. Structured Computer Organization Andrew S Tanenbaum, Prentice-Hall of India
5. Computer Systems Organization & Architecture – John D Carpinelli, Addison-Wesley

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: IV Semester **Branch:** Computer Science & Engg.
Subject: Principles of Management **Code:** 322416(36)
Total Theory Periods: 40 **Total Tut. Periods:** 10
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 03

Unit-I

Introduction - Definition of Management, Nature and Basic Concepts of Management, Management and Administration, Functions of Manager & Information age; Science, theory and practice of Management.

Managerial objectives and Role, Evolution of management Thoughts, Business Environment, Social attitudes beliefs and Values, Social Responsibilities of Business.

Unit-II

Functions of Management- Planning, Nature and importance, Steps in Planning; Organizing and process of organizing; Staffing, Systems approach to staffing; Directing; Controlling and process of controlling, Decision Making.

Unit-III

Motivation-Meaning, need for motivation, Theories of Motivation.
Leadership – Meaning and styles, group and team working, HRM.

Unit –IV

Functional Areas: Marketing - Market and Marketing environment, Consumer / buyer behavior, marketing mix, Advertisement and sales Promotion.

Financial Management – Introduction to Book keeping and financial statements, Break Even analysis.

Unit-V

Emerging Trends in Management- Production and Productivity, Production Planning and Control, TQM, Globalization and WTO, Business process reengineering, IT in Management, Outsourcing.

Text Books:-

1. Govindrajan M, & Natrajan, S, Principles of Management, Prentice Hall of India, N. Delhi,2005.
2. Luthans Fred Organizational Behavior, TMH, New Delhi

Reference Books:-

1. Koontz and O'Donnell, Principles of Management and administration, Prentice Hall of India (PHI)
2. Peter F Drucker, The Practice of Management, Allied Publicatons.
3. Robbins, S. P. 3rd edition, Fundamental of Management, PHI, N. Delhi,2005
4. Chandan J. S, Management Concepts and Strategies, Vikas Publication, N. Delhi,2006
5. S.N. Maheshwari, An Introduction to accountancy Vikas Publication, N Delhi.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: IV

Branch: Computer Science & Engg.

Subject: Data Structures Lab

Practical Code: 322421(22)

Total Practical Period: 36

Total Marks in End Semester Exam. : 40

1. Write a program to perform following in one dimensional array., Insertion, Deletion and Searching (Linear & Binary).
2. Write a program to implement stack and perform push pop operation.
3. Write a program to convert infix to postfix expression using stack.
4. Write a program to perform following operation in linear queue - addition, deletion, traversing
5. Write a program to perform following operation in circular queue - addition, deletion, traversing
6. Write a program to perform following operation of double ended queue - addition, deletion, traversing
7. Write a program to perform following operation in single link list.-creation, inversion, deletion
8. Write a program to perform following operation in double link list – creation, insertion, deletion.
9. Write a program to implement polynomial in link list and perform
 - a. Polynomial arithmetic
 - b. Evaluation of polynomial
10. Write programs to implement linked stack and linked queue
11. Write programs to perform Insertion, selection and bubble sort.
12. Write a program to perform quick sort.
13. Write a program to perform merge sort.
14. Write a program to perform heap sort
15. Write a program to create a Binary search tree and perform –insertion, deletion & traversal.
16. Write a program to traversal of graph (B.F.S, D.F.S)

Recommended Books :

1. “Data structure using C “ by Samir kumar Bandyopadhyay, Kashi nath Dey
2. “ C and Data structures “ Ashok K Kamthane Pearson Education.
3. An Introduction to Data Structures with Application by Tremblay & Sorenson (Tata Mc)
4. Fundamentals of Data Structure by Horowitz & Sahni (Galgotia)
5. Data Structures using C by ISRD Group (Tata Mc)
6. Data Structures using C/C++ by langsam, Augenstein & Tananbaum (PHI)
7. Data Stuctures & Program Design by Robert L Kruse (PHI)

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: **IV**

Branch: **Computer sc. Engg.**

Subject: **Computer hardware simulation lab:**

Code: **322422(22)**

Total Practical Periods: **36**

Total Marks in End Semester Exam: **40**

Experiments to be performed (minimum 10 experiments)

1. Simulation of AND gate and OR gate
2. Simulation of XOR gate and XNOR gate
3. Simulation of universal gates.
4. Design and simulation of the Binary to gray code converter
5. Design and simulation of the Hex to 8-4-2-1 (BCD) converter
6. Design and simulation of the half adder
7. Design and simulation of the Full adder
8. Design and simulation of the Parity check converter
9. Design and simulation of 3 to 8 decoder
10. Design and simulate 8 to 1 multiplexer
11. Design and simulation of J-K flip flop
12. Design and simulation of D-flip flop
13. Design and simulation of 8 bit SISO register
14. Design and simulate $Y = AB + CD$ using implementation of PLA.
15. Design and simulate $Y = AB + CD$ using implementation of PLA.
16. Design & Simulate control unit (timing unit) for experiment no. 4 , or experiment no.7 or experiment no.8

List of Equipment/Machine Required

Any relevant simulators

Recommended books:

1. Computer simulation laboratory manual
2. Digital circuit design by: R.P Jain
3. Digital logic & computer design by Morris mano

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: IV

Branch: Computer Science & Engg.

Subject: Object Oriented Concepts &

Practical Code: 322423 (22)

Programming using C++ Lab

Total Practical Period: 36

Total Marks in End Semester Exam: 40

1. Write a Program to check whether number is prime or not.
2. Write a Program to read number and to display the largest value between:
A. Two number B. Three Numbers C. Four number by using switch-case statements.
3. Write a Program to find sum of first natural numbers : sum= 1+2+3+4+..... 100 by using a. for loop b. while loop c. do-while loop
4. Write a Program to find sum of the following series using function declaration.
Sum= $x - (x)^3/3! + (x)^5/5! - \dots \dots \dots (x)^n/n!$
5. Write a Program to read the element of the given two matrix & to perform the matrix multiplication.
6. Write a Program to exchange the contents of two variable by using
(a) call by value (b) Call by reference.
7. Write a Program to perform the following arithmetic operations of a complex number using a structure (a). Addition of the two complex number (b). Subtraction of the two complex number (c). Multiplication of the two complex number (d). Division of the two complex number.
8. Write a Program to generate a series of Fibonacci Nos. using the constructor where the constructor member function had been defines (a). is the scope of class definition itself (b). out of the class definitions using the scope resolutions operator. Also make this program with the help of the copy constructor.
9. Write a Program to demonstrate how ambiguity is avoided using scope resolution operator in the following inheritance (a). Single inheritance (b). Multiple inheritance
10. Write a Program to perform the swapping of two data items of integer, floating point number and character type with the help of function overloading.
11. Write a Program to generate a Fibonacci series by overloading a. Prefix Operator b. Postfix Operator.
12. Write a Program to access the private data of a class by non-member function through friend function where the friend function is declared : (1). is the location of public category (2). is the location of private category (3). With in the scope of a class definition itself (4). Defined with inline code subtraction.
13. Write a Program to demonstrate how a pure virtual function defined declared and invoked from the object of derived class through the pointed of the base class.
14. Write a Program to Bubble Sort Using template function.
15. Write a Program for invoking for that Generate & Handle exception.

List of Equipment/Machine Required

Pentium IV machine, Turbo C++ compiler

Name of Text Books :

1. Programming with C++ : D Ravichandran
2. OOP's with C++ : E. Balaguruswamy .

Name of Reference Books:

1. Programming with C++ : Venugopal .
2. Object Oriented Programming in C++ : StroutStrups.
3. OOP with C++ : Robert Lafore
4. Let us C++ : Yaswant Kanetkar.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: IV

Branch: Computer Science & Engineering

Subject: Software Technology Lab-1

Practical Code: 322424(22)

Total Practical Period: 36

Total Marks in End Semester Exam: 40

Experience to be performed (minimum 10 experiments)

1. Visual Basic- an Integrated Development Environment (IDE): An introduction, Explain New project window, Property window, Project Explorer window, Watch window, etc. Design and identity card containing information regarding students such as Name, Roll No., Address, Class studying, Date of Birth, Blood Group, Phone No., etc. Add a Exit Button.
2. Develop an application to calculate Interest. It should accept rate of interest, period for calculation of interest (years), amount on which interest is to be calculated (Rs.). After clicking Compute Investment amount (Principal + Interest) should be displayed in separate text box.. Add Exit button, Proper text box controls and labels to be used. Provide 2 options- Simple, Compound interest. Provide Picture and Radio Button control.
3. Design a Simple Calculator to implement addition, subtraction, multiplication, division, remainder operations of two digits(include validation of input & proper message).
4. Create a form using check box & option box to give effect for fonts such as bold, italic, underline, strike through respectively for the text entered in the Rich Text Box (add status bar control).
5. Create a form to access drive list, directory list, and files within a directory of the computer you are using (use Tree structure, menus & toolbars).
6. Design a form for demonstration of print method (Error code, Error message display). Use print control box. Log the status of each message in a log file.
7. Demonstrate use of Date Environment, add tables and queries, place fields on form, report etc.
8. Generate single table report & two table grouped report outputs.
9. Design a program to display regional languages of different states in India. Take many names of status of India in one list box control and other text box control should display their languages e. g. Maharashtra → Marathi etc.
10. CASE STUDY (Design and develop one of the following three case studies):
 1. Create a Scientific Calculator (add minimum 15 functions).
 2. Develop a program for Online Examination system, which includes database and record keeping facility.
 3. Develop a program for Payroll System, which can handle database as well as can print the pay slips of employees. In this system provide a Login Window, which will accept the User Name and Password. After verifying the user information, the user should get the access to Payroll System.
11. Create a Simple Notepad application, which contains Menus, Rich Text Box, Common Dialog box, Formatted text, using Toolbar, and Replace text, Windows (Tile / Cascade), Status bar and scroll bar.
12. Modify the practical No. 7 to add following buttons: FIND, ADD, DELETE, UPDATE, and CANCEL. Give proper code to perform the activity described by the buttons.
13. Display the Table Data using ADODC. Add Find, Delete, Update, Cancel Buttons on the form.
14. Display the data from two different tables having common keys using Visual data manager. Use Flex Gride control to display data.
15. Use Active -X control in the form which is created in previous practical.

List of Equipments / Machine Required:

1. P-3 or above Computer System.
2. Microsoft Visual Studies 6.0
3. MSDN Library
4. Database (Oracle / MS Access)

Recommended Books

1. Black Book (VB)
2. Complete Reference (VB)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Semester : IV Sem.
Subject : **HEALTH, HYGIENE & YOGA**
No. of Periods : 2 pds/week
Total Marks in End Semester Exam. : NIL
Minimum number of class tests to be conducted: Two

Branch: Common for all branches
Code : 300425 (46)
Tutorial Periods : NIL
Teacher's Assessment: 40 Marks

UNIT- I

HEALTH & HYGIENE: Concept of health, Physical health and mental health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and undereating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT- II

INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE: History, development, basic concepts, modes of operation of Alopahy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accupressure, Accupuncture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III

YOGASANS: Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra,

UNIT- IV

YOGASANS FOR COMMON DISEASES: From Yogic Materia Medica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomach disorders, such as, indigestion, acidity, dysentery, piles and fissures, arthritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasana, Makarandasan, Matsyandrasana, Shashankasana.
- **Asans to increase memory and blood supply to brain :** Shirshasana, Shashankasana.
- **Asans for eye sight:** Tratak, Neti Kriya .
- **Pranayam :** Definition and types : Nadi Shodhan, Bhastrika, Shitali, Bhramari useful for students.

UNIT V

CONCENTRATION: Concentration of mind and how to achieve it. Tratak [1/4] Concentration on breath, Japa [1/4] Ajapa [1/4] internal silence [1/4] visualization in mental sky [1/4] Concentration on point of light [1/4] Concentration on feeling [1/4] Concentration on figure [1/4]

REFERENCES

- (1) Yogic Materia Medica
- (2) Asana, Pranayama and Bandha