## Scheme of teaching and examination

### B.E. IV Semester Computer Science & Engineering

<table>
<thead>
<tr>
<th>S.No</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Periods per week</th>
<th>Scheme of exam</th>
<th>Total Marks</th>
<th>Credit</th>
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<tbody>
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<td>L</td>
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<td>P</td>
<td>ESE</td>
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<tr>
<td>1</td>
<td>Appl. Mathematics</td>
<td>322411(14)</td>
<td>Computational Mathematics</td>
<td>4</td>
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<td>Data Structures</td>
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<td>4</td>
<td>Comp Science &amp; Engg</td>
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<td>Computer Systems Architecture</td>
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<td>5</td>
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<td>322415(22)</td>
<td>Object Oriented Concepts &amp; Programming using C++</td>
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<td>6</td>
<td>Management</td>
<td>322416(36)</td>
<td>Principles of Management</td>
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<td>7</td>
<td>Comp Science &amp; Engg</td>
<td>322421(22)</td>
<td>Data Structures Lab</td>
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<td>322422(22)</td>
<td>Computer Hardware Simulation Lab</td>
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<td>Object Oriented concepts Programming using C++ Lab</td>
<td>3</td>
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<td>322424(22)</td>
<td>Software Technology Lab - 1</td>
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<td>Humanities</td>
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<td>Health Hygiene and Yoga</td>
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TOTAL: 19 L 6 T 15 P 640 ESE 120 CT 240 TA 1000 Credit 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.)

Subject: Computational Mathematics Code: 322411 (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 NUMERICAL SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS
(No. of periods 8+2)

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)

TEXT BOOKS:

REFERENCE BOOKS:
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: -
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 & Compeny 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
4. Discrete Mathematical Structures with applications to computer science, by J.P. Tremblay and R.
   Manohar, Tata McGraw-Hill.
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, Adjacency 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
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
2. Computer Organizations and Design- P. Pal Chaudhari, Prentice-Hall of India

Name of reference Books:
1. Computer System Architecture - M. Morris Mano, PHI.
4. Structured Computer Organization Andrew S Tanenbaum, Prentice-Hall of India

UNIT II: Classes & Object: Specifying a class, Define member function, Scope of class and its member, Nested Class, Data hiding & encapsulation, Friend function, Array within a class, array of object as function argument, function returning object, static member.

UNIT III: Constructors and Destructors: Constructor function, parameterized multiple constructor, default constructor, copy constructor, const and class, Data conversion between objects of different classes, Destructor function, Polymorphism, function overloading, Operator overloading.

UNIT IV: Inheritance, Pointer & Virtual function: Define derived classes, single inheritance, multilevel inheritance, Hierarchical inheritance, Hybrid Inheritance, Pointers to objects, this pointer, Pointers to derived class, Virtual function, Pure Virtual function, Abstract classes.

UNIT V: File I/O & Templates: files streams, opening & closing a file, read() & write() functions, detecting end-of-file, seekp(), seekg(), tellg(), tellp() function. Introduction to Templates & Exception, Creating and handling Templates and Exception in OOP.

Name of Text Books
1. OOPS with C++: E. Balagurusamy
2. OOP with C++: Robort Laphore.

Name of Reference Books
2. Programming with C++: Venugopal.
3. Programming with C++: D Ravichandran
4. Let us C++: Yashwant Kanetkar
5. C++ and OOPs Paradigm by Debasish Jana (PHI)
6. OOP-P Sengupta & B.B. Choudhari (PHI)
7. OOP with C++ by M.P. Bhave & S. A. Patekar (Pearson Education)
8. OOP with C++: Poonamchanda Sarang (PHI)
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:-
2. Luthans Fred Organizational Behavior, TMH, New Delhi

Reference Books:-
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
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.)

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
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
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.
   \[\sum = x^\frac{1}{3!}+(x)^\frac{1}{5!}+\ldots\ldots\ldots+(x)^\frac{n}{n!}\]
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.
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).
7. Demonstrate use of Date Environment, add tables and queries, place fields on form, report etc.
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 Grid 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
4. Database (Oracle / MS Access)
2. Microsoft Visual Studies 6.0
3. MSDN Library

Recommended Books
1. Black Book (VB)
2. Complete Reference (VB)
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 Allopathy, 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, Matsyasanas, 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: Shavasan, Makarasana, Matsyakridasan, Shashankasan.
- Asans to increase memory and blood supply to brain: Shirsh padasan, Shashankasan.
- Asans for eye sight: Tratak, Neti Kriya.
- Pranayam: Definition and types: Nadi Shodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT V

CONCENTRATION: Concentration of mind and how to achieve it, Tratak ¼=kVd½ Concentration on breath, Japa ¼=½ Ajapajap ¼=tik½ internal silence ¼=UrŠZu½ visualization in mental sky ¼=ukZ/kku½ Concentration on point of light ¼=T;kfr /ku½ Concentration on feeling ¼=kkko /ku½ Concentration on figure ¼=ewëkZ /ku½-

REFERENCES
(1) Yogic Materia Medica
(2) Asan, Pranayam and Bandh