

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## Scheme of Teaching & Examination BE (Information Technology) IV Semester

Sl. No	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Appl. Mathematics	333451(14)	Computational Mathematics	4	1		80	20	20	120	5
2	Info. Technology	333452(33)	Telecom Switching & Computer Networks	3	1		80	20	20	120	4
3	Comp. Science & Engg.	333453(22)	Data Structures and Algorithm Analysis	3	1		80	20	20	120	4
4	Electronics & Telecom.	333454(28)	Analog Electronics Circuits	3	1		80	20	20	120	4
5	Info. Technology	333455(33)	Object Oriented Concepts & Programming using C++	3	1		80	20	20	120	4
6	Info. Technology	333456(33)	Computer Organization and Architecture	3	1		80	20	20	120	4
7	Info. Technology	333461(33)	Telecom Switching & Computer Networks Lab (NS-2/QUALNET/OPNET)			3	40		20	60	2
8	Info. Technology	333462(33)	Data Structures and Algorithm Analysis Lab			3	40		20	60	2
9	Electronics & Telecom.	333463(28)	Analog Electronics Circuits lab			3	40		20	60	2
10	Info. Technology	333464(33)	Object Oriented Concepts & Programming using C++ Lab			3	40		20	60	2
11	Humanities	333465(46)	Health , Hygiene and Yoga			2			40	40	1
12			<b>Library</b>			<b>1</b>					
			<b>TOTAL</b>	<b>19</b>	<b>6</b>	<b>15</b>	<b>640</b>	<b>120</b>	<b>240</b>	<b>1000</b>	<b>34</b>

**L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers 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. students. 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

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Subject: **Computational Mathematics**

Semester: **IV**

Code: **333451(14)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. To provide knowledge of various methods for numerical solutions of algebraic and transcendental equations, simultaneous equation and ordinary differential equations.
2. To provide a thorough understanding of interpolation and numerical differentiation and integration.

- UNIT-I NUMERICAL SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:** Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Birge-Vieta Method, Bairstow's Method.
- UNIT-II NUMERICAL SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS:** Direct Methods - Gauss Elimination, Gauss-Jordan & Crout's Triangularisation Method. Iterative Methods - Jacobi's, Gauss-Siedal & Successive over Relaxation Method.
- UNIT-III INTERPOLATION WITH EQUAL AND UNEQUAL INTERVALS:** 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-IV NUMERICAL DIFFERENTIATION AND INTEGRATION:** Derivatives using Forward, Backward and Central Difference Formulae. Newton-Cote's Quadrature Formula, Trapezoidal rule, Simpson's rules, Weddle's rule.
- UNIT-V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:** 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.

## 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. Shastri, Prentice Hall Inc. India 1998.
4. Iyengar & R. K. Jain, Wiley Eastern Limited.

## Course Outcome:

After completion of this course students will be able to find Numerical solution of various equations, which may be arising due to mathematical modelling based on engineering problems.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Semester: **IV**

Subject: **Telecom Switching & Computer Networks**

Code: **333452(33)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. To explore basics idea about the networking and its applications.
2. To motivate students so as to identify and design computer network according to their need.
3. To develop an idea about working of telephone exchange and cable technology.
4. To develop an idea for secure data communication on networks.

**UNIT-I TELEPHONY & CABLE TECHNOLOGY:** Basic concept of telephony system & topology, Framing, Multiplexing, Flow/ Error control, Multiple access, Circuit / Packet switching, Addressing / Routing, Subscriber loop system, switching hierarchy and routing, PSTN, ISDN, DSL, ADSL. Cable technologies.

**UNIT-II COMPUTER NETWORK:** Introduction, Perspective of network, protocols and standard, Network Topologies, Transmission Mode, categories of network; LAN, MAN, WAN, OSI Model, Functions of the layer, TCP/IP Protocol suit, Link Configuration, Asynchronous and Synchronous mode. Physical layer: Digital data transmission, DTE-DCE Interface, other Interface Standard, V.24 Null Modem, Modem Standards, cable Modem, Transmission Media, Data Link layer: Types of Errors, Error Detection and Correction Methods, Flow Control, HDLC, Brief Details of Data Link Protocols.

**UNIT-III LOCAL AREA NETWORK & UPPER LAYERS:** Aloha, slotted aloha IEEE 802 Standards; IEEE 802.1, LLC, MAC, PDU, ETHERNET: Access method, addressing, Frame Format, Implementation, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, Token Bus, Token Ring, FDDI, OSI layers: Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, Networking and Internetworking devices :Overview of repeaters, Bridges, routers, Gateways, Hubs. TCP: TCP Services, TCP Header Format, FTP, SMTP, HTTP.

**UNIT-IV EXAMPLE NETWORKS & ROUTER DESIGN:** Switched packet & data services, concept of ingredient, X.25, Frame relay, ISDN, ATM network, ATM signaling and PNNI routing, ATM traffic management, IP over ATM to MPLS, Decoupling, Introduction to traffic engineering, high speed router design.

**UNIT-V CRYPTOGRAPHY & DIGITAL SIGNATURE:** Cryptography: Encryption; Decryption; Cryptogram (cipher text); Single key (Secret key); Cryptography; two key (Public key) cryptography; Single key cryptography; The data Encryption Standard; Public Key Cryptography; Diffie-Hellmann public key distribution; The Rivest- Shamir Adelman(R-S-A) system for public key cryptography; Digital Signature, Certification authority.

## Text Books:

1. Data Communication & Networking by Behrouz A. Forouzan.
2. Data and Computer Communication by William Stalling (Pearson Education)
3. Computer Networks by Andrew S.Tanenbaum

## Reference Books:

1. Computer Networking by Ed Tittel (Schaum's series) (TMH)
2. Cryptography and Network Security by Atulkahate (TMH)
3. Telecom Switching system & Networking by Thiagrajanviswanathan (PHI)

## Course Outcomes:

1. Students will be able to acknowledge about the working of telephone exchange and cable technology.
2. They will learn about concepts of networks and its basic components.
3. They will be in condition to identify different types of computer networks and protocols used.
4. They will be able to explain different types of networks are in use and how to communicate securely using them.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Semester: **IV**

Subject: **Data Structures & Algorithm  
Analysis**

Code: **333453(22)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. Demonstrate familiarity with major algorithms and data structures
2. Analyse performance of algorithms.
3. To teach the data organization and types of data structures.
4. To make the students learn about the basic operations on linear and non-Linear data structures and the internal memory mappings for all types of data structures.
5. Determine which algorithm or data structure to use in different scenarios.
6. Be familiar with writing recursive methods

**UNIT-I Algorithm Analysis:** Analyzing algorithms, Algorithm types, Recurrence Equations, Growth function: Asymptotic notation, Standard notation & common functions, Recurrence relation, different methods of solution of recurrence equations with examples. Representation and Mapping of Arrays in Memory, Matrices: Polynomial Arithmetic, Sparse Matrices and its Transpose computation methods, Performance Analysis.

**UNIT-II Linear Data Structures:** Stacks: Array Representation, Nested Arithmetic Expression: Polish Notation and Conversions, Recursion, Queues: Array Representations and Boundary Parameters, Circular Queues, D-Queues, Priority Queues. 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 Arithmetic, Circular Linked List, Operations on Doubly Linked List: traversing, Searching, Deleting, Inserting. Linked Representation of Stacks and Queues.

**UNIT-III Sorting and Searching:** Insertion, Selection, Bubble sort methods, Divider and conquer: Quick sort, Merge Sort, Shell sort & Radix sort, Comparison of various sorting techniques. **Searching Techniques:** Sequential search, Binary search, Comparison trees, Performance Comparison of searching algorithms, **Hashing:** Hash Function- Open and Closed Hashing, Hash collisions, Rehashing techniques, Extendible hashing.

**UNIT-IV Binary Trees:** Terminologies, Representation of binary Trees: Using Arrays and linked lists, Binary Tree Traversals: Recursive and Non-Recursive techniques, Threaded Binary trees, Binary search tree operations: Traversal, Searching, Inserting and Deleting elements; AVL search tree operations: Insertion and Deletion, m-way search tree, Searching Insertion and Deletion in an m-way search tree, Searching, Insertion and Deletion in a B- tree, Heap Sort.

**UNIT-V Graphs:** Terminologies, Representation of Graphs: Adjacency Matrices and Adjacency lists, Warshall's algorithm: Path Matrix computation and Shortest Paths, Graph operations: Traversal, Searching (depth-first and Breadth-first), Topological Sorting, spanning tree computation, minimum spanning trees.

## Text Books:

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

## Reference Books:

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

## Course Outcomes:

After successful completion of this course, the students will be able to-

1. Understand the performance issues involved in computing algorithm time-complexities.
2. Understand and implement basic data structures such as arrays, lists, trees, stacks, queues, binary search trees etc.
3. Get the knowledge of the data structures and algorithms on which file structures and data bases are based.
4. Obtain hands-on experience of algorithmic design and implementation through practical sessions of the subject.
5. Implement various searching and sorting algorithms
6. Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Subject: **Analog Electronics circuits**

Semester: **IV**

Code: **333454(28)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. To explore basics idea about the communication devices that play very important role in the field of communication.
2. To motivate students to develop a sound foundation for forthcoming communication subjects.
3. To take an initiative to develop analog electronics simulator, which can be utilizes for simulation laboratory work for college students.
4. To learn about all oscillator circuits, utilization of devices in communication devices.

**UNIT-I LOW FREQUENCY TRANSISTOR AMPLIFIER:** Graphical Analysis of CE amplifier; h-parameter Models for CB, CE, CC configurations and their Interrelationship; Analysis and Comparison of the three Configurations; Linear analysis of Transistor Circuits: Miller's Theorem: Cascading: Simplified Models and Calculation of CE and CC Amplifiers; Effect of emitter Resistance in CE amplifiers: Cascade amplifiers: Darlington Pair.

**UNIT-II HIGH FREQUENCY TRANSISTOR AMPLIFIERS:** CE hybrid- $\pi$  model: Validity and parameter Variation: Current Gain with Resistive load: frequency response of a single stage CE Amplifier: Gain-Bandwidth product: CC stage High frequencies.

**UNIT-III MULTISTAGE AMPLIFIERS:** Classification: Distortion in Amplifiers: Frequency Response: Bode plots: Step Response: pass band of Cascaded Stages: Response of a Two-stage RC Coupled Amplifier at Low and high frequencies: Multistage amplifiers: Sources of Noise in Transistor Circuits: Noise Figure.

**UNIT-IV FEEDBACK AMPLIFIERS:** Classification: Feedback concept; Ideal Feedback amplifier: Properties of Negative Feedback Amplifier Topologies: Method of Analysis of Feedback amplifiers: Voltage series Feedback: Voltage series Feedback pair: Current series, Current shunt and Voltage shunt feedback; Effect of feedback on amplifier Bandwidth and stability.

**UNIT-V OSCILLATOR:** Sinusoidal oscillator: phase shift oscillators, Wien Bridge oscillator: Resonant circuit oscillators: LC Collpit & LC Hartley, Amplitude Frequency and phase stability analysis of all Oscillators, General form of Oscillator Configuration; Crystal oscillator.

## Text Books:

1. Integrated Electronics – Millman & Halkias, TMH.
2. Microelectronics – Millman and Grabel, TMH.

## Reference Books:

1. Electronic Devices & Circuits – David A. Bell, PHI
2. Microelectronics – B. Razavi

## Course Outcomes:

After completion of this course students will be able to -

1. Possess knowledge about the fundamental communication devices like amplifiers and oscillator and their importance in communications.
2. Understand design considerations of these devices according to specific applications.
3. Understand the amplitude and frequency responses of common amplification circuits.
4. Develop the ability to analyze and design analog electronic circuits using discrete components.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Subject: **Object Oriented Concepts & Programming using C++**

Semester: **IV**

Code: **333455(33)**

Total Theory Periods: **40**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours**

Total Tutorial Periods: **10**

Assignments: **Two (Minimum)**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. Understand object-oriented programming features in C++,
2. Apply these features to program design and implementation,
3. Understand object-oriented concepts and how they are supported by C++,
4. Understand implementation issues related to object-oriented techniques,
5. Build good quality software using object-oriented programming technique

**UNIT-I Object-Oriented Programming Concepts:** Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

**UNIT-II Standard Input/Output:** Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators. **Classes and Objects:** Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of *const* keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

**UNIT-III Pointers and Dynamic Memory Management:** Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using *new* and *delete* operators, pointer to an object, *this* pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures. **Constructors and Destructors:** Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initializer lists.

**UNIT-IV Operator Overloading and Type Conversion:** Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type. **Inheritance:** Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.

**UNIT-V Virtual functions & Polymorphism:** Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors. **Exception Handling:** Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception, specifying exceptions. **Templates and Generic Programming:** Template concepts, Function templates, class templates, illustrative examples. **Files:** File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

## Text Books:

1. Lafore R., Object Oriented Programming in C++, Waite Group.
2. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.

## Reference Books:

1. R. S. Salaria, Mastering Object-Oriented Programming with C++, Salaria Publishing House.
2. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley.
3. Herbert Schildt, The Complete Reference to C++ Language, McGraw Hill-Osborne.
4. Lippman F. B, C++ Primer, Addison Wesley.
5. R. S. Salaria, Test Your Skills in Object-Oriented Programming With C++, Salaria Publishing House.

## Course Outcomes:

1. Knowledge and Understanding- At the end of a course the student will understand the concepts of:
  - a) Variables, data Types (including strings and arrays) and Expressions
  - b) Flow of Control
  - c) Functional and procedural abstraction and its importance in good program design
  - d) Pointers and memory allocation (static and dynamic)
  - e) Iteration and Recursion
2. Skills - At the end of the course, a student will be able to:
  - a) Analyse a simple programming problem specification
  - b) Design a high-level (programming language independent) solution to the problem using functional abstraction and general imperative programming language constructs.

Write, compile, execute and debug a C++ program which maps the high-level design onto concrete C++ programming constructs

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**  
Branch: **Information Technology**  
Subject: **Computer Organization & Architecture**

Semester: **IV**  
Code: **333456(33)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study the different ways of communicating with I/O devices and standard I/O interfaces.
4. To study the hierarchical memory system including cache memories and virtual memory.

**UNIT- I BASIC COMPUTER ORGANIZATION AND DESIGN:** Computer Organization and Architecture: Introduction, Machine Language Milestone in Computer Architecture, Interconnection Structure: Bus Interconnection, MAR, MBR, PC, IR, PCI. Data Path of Von Neumann Machine, Instruction Code, Decoding and Execution. The Fetch Decode Execute Cycle: Example, Instruction Formats, Stack Organization, Addressing Modes.

**UNIT-II ARITHMETIC PROCESSING DESIGN:** Fixed-Point Arithmetic- Addition and Subtraction: addition and subtraction with Signed- Magnitude Data, Hardware Implementation, Hardware Algorithm, addition and subtraction with Signed- 2's Complement Data. Multiplication Algorithm: Hardware Implementation, Hardware Algorithm, Binary Multiplication, Booth Multiplication Algorithm. Division Algorithm, Floating-Point Arithmetic Operations: Basic Considerations, Register Configuration, Addition, subtraction, Multiplication & Division.

**UNIT- III CONTROL UNIT ORGANIZATION:** The Control Unit: Type of control unit, Control Unit Function, Control Unit Operation, Hardwired Control Unit- Basic Concept, Advantages, Disadvantages. Micro- Programmed Control Unit- Basic Concept, Advantages, Disadvantages. Difference between Hardwired Control Unit and Micro-Programmed Control Unit, Control Memory, Address Sequencing.

**UNIT-IV STORAGE AND MEMORY HIERARCHY:** Basic Concept and Terminology, Memory Hierarchy, Semiconductor Memories- RAM and ROM Chips, Memory Address Mapping, Memory connected to CPU. Memories and Interleaving- Virtual memory, Cache memories, Cache memory working principles, Cache coherence issues, Cache performance analysis. Memory Management Hardware Requirements.

**UNIT-V INPUT/OUTPUT ORGANIZATION:** Programmed I/O, I/O Addressing, I/O instruction, Synchronization, I/O Interfacing, Interrupt Mechanism, DMA, I/O Processors and Data Communication. Introduction to Pipelining: Linear and Non Linear.

## Text Books:

1. Computer System Architecture By, M. Morris Mano Prentice- Hall, 1993.
2. Computer Architecture & Organization By John P. Hayes, McGraw Hill-1998
3. Computer Organization & Architecture By V. Rajaraman , T. Radhakrishnan , PHI

## Reference Books:

1. Structured Computer Organization by Andrew S. Tanenbaum.
2. Computer architecture a quantitative approach, Patterson D. A. and Hennessy, J. L.,
3. Second Edition, Morgan Kaufman, 1996.
4. Computer Organization and Architecture, W. Stallings, LPE
5. Computer Organization and Design, P. Pal Chaudhary, PHI

## Course Outcomes:

After successful completion of this course, students will be able to-

1. To master the binary and hexadecimal number systems and computer arithmetic,
2. To identify machines based on Von Neumann architecture and shall also be familiar with the functional units of the processor such as the register file and arithmetic-logical unit.
3. To identify systems based on single-cycle (MIPS), multi-cycle (MIPS), parallel, pipelined superscalar, and RISC/CISC architectures.
4. To analyze the cost-performance issues and design trade-offs in designing and constructing a computer processor including memory chips.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**  
Branch: **Information Technology**  
Subject: **Telecom Switching & Computer Networks  
Laboratory (NS2 / QUALNET/OPNET)**

Semester: **IV**  
Code: **333461(33)**

Total Lab Periods: **36**  
Maximum Marks: **40**

Batch Size: **30**  
Minimum Marks: **20**

## **List of Experiments:** *(At least Ten experiments are to be performed by each student)*

1. Introduction to Local Area Network with its cables, connectors, Switches, Hubs and topologies.
2. Installation of UTP, Co-axial cable, Cross cable, parallel cable NIC and LAN card.
3. To study the network topology and IP Addressing scheme of Institute Network.
4. Case Study of Ethernet (10 base 5, 10 base 2, 10 base T)
5. Installation and working of Net meeting and Remote Desktop.
6. Installation and working with Telnet (Terminal Network).
7. Installation and working with FTP (File Transfer Protocol). Write a program to simulate FTP Server.
8. Installation and Computers via serial or Parallel ports and enable the computers to share disk and printer port.
9. To connect two Personal Computer with Telephone line.
10. Installation of Modem and Proxy Server.
11. Installation of Windows 2003 server/ Windows 2000 server.
12. Introduction to Server administration and Configuration of DHCP.
13. Write a program to encrypt and decrypt a file using a key.
14. Write a program to simulate the stop and wait protocol.
15. Write a program to simulate the Go n Back ARQ protocol.
16. Write a program to simulate echo server.

## **LIST OF EQUIPMENTS/MACHINES REQUIRED**

- Software Requirements: - Windows 2003 server/Windows 2000 server.
- Hardware Requirements: - LAN Trainer Kit LAN Card Cable, Connectors, HUB, Switch, Crimping Tools.

## **Recommended Book:**

Computer Network and internet by Douglas E. Comer (Pearson Education)



# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**  
Branch: **Information Technology**  
Subject: **Data Structures and Algorithm Analysis  
Laboratory**

Semester: **IV**  
Code: **333462(33)**

Total Lab Periods: **36**  
Maximum Marks: **40**

Batch Size: **30**  
Minimum Marks: **20**

***List of Experiments: (At least Ten experiments are to be performed by each student)***

**(Note: The programs can be implemented using C or C++ in windows or Linux environment)**

1. Write a program to perform following operations in 1-d array: insertion, deletion, reverse, display, and search.
2. Write a program to perform matrices addition, multiplication and transpose.
3. Write a program to perform linear and binary search.
4. Write a program to add two polynomials using array.
5. Write a program to implement sparse matrices and transpose of matrices.
6. Write a program to perform bubble sort on a given array.
7. Write a program to perform selection sort on a given array.
8. Write a program to perform insertion sort on a given array.
9. Write a program to perform quick sort on a given array.
10. Write a program to perform merge sort on a given array.
11. Write a program to implement stack operations:push, pop.
12. Write a program to check palindrome using stack.
13. Write a program to evaluate postfix expression using stack.
14. Write a program to convert infix expression into postfix or prefix expression using stack.
15. Write a program to check nested expression validity using stack
16. Write a program to implement queue operations: insertion, deletion.
17. Write a program to implement insertion at the beginning and the end of linked list.
18. Write a program which represents stack using linked list.
19. Write a program which represents queue using link list.
20. Write a program to perform arithmetic addition of two very large integers using doubly linked list.
21. Write a program to perform all the three types of tree traversals upon the constructed binary search tree.
22. Write a program to perform binary tree sorting to display the data in ascending and descending order sequence.
23. Write a program to display the adjacency matrix and adjacency list equalent on a given graph structure
24. Write a program to perform depth first search on a given graph structure.
25. Write a program to perform breadth first search on a given graph structure.

## **List of Equipments/Software/Machines Required**

- Linux Operating System and/ or Windows Operating System
- Turbo C/C++ IDE and compiler.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**  
Branch: **Information Technology**  
Subject: **Analog Electronics Laboratory**

Semester: **IV**  
Code: **333463(28)**

Total Lab Periods: **36**  
Maximum Marks: **40**

Batch Size: **30**  
Minimum Marks: **20**

## List of Experiments: (At least Ten experiments are to be performed by each student)

1. Static output characteristic curve CE transistor.
2. Static input characteristic curve of CB transistor.
3. Static output characteristic curve of CB transistor.
4. To design and study the frequency response of single stage CE transistor amplifier.
5. To study the frequency response of RC coupled double stage CE transistor amplifier.
6. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback.
7. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback.
8. To plot the voltage gain vs. load characteristics of common collector (emitter follower) n-p-n transistor.
9. Experiment with emitter follower a voltage series feedback amplifier.
10. General study of push pull audio power amplifier.
11. To study RC phase shift oscillator.
12. Study of various topologies of feedback amplifier.
13. Experiment with Darlington pair amplifier.
14. To study Wein Bridge Oscillator.

## **List of Equipments/Machines Required**

Bread board, Circuit components, Power supply, Cathode Ray Oscilloscope (CRO), Function generator, Multimeter

## **Recommended Books:**

1. Integrated Electronics – Millman & Halkias, TMH.
2. Microelectronics – Millman and Grabel, TMH.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**  
Branch: **Information Technology**  
Subject: **Object Oriented Concepts & Programming**  
**using C++ Laboratory**

Semester: **IV**  
Code: **333464(33)**

Total Lab Periods: **36**  
Maximum Marks: **40**

Batch Size: **30**  
Minimum Marks: **20**

## List of Experiments: (At least Ten experiments are to be performed by each student)

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 numbers by using switch-case statements.
3. Write a Program to find sum of first natural numbers:  $sum = 1+2+3+4+\dots+100$  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:  $Sum = x - (x^3)/3! + (x^5)/5! - \dots + (-1)^n (x^n)/n!$
5. Write a Program to read the element of the given two matrixes & to perform the matrix multiplication.
6. Write a Program to exchange the contents of two variables 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 two complex numbers, (b) Subtraction of two complex numbers, (c) Multiplication of two complex numbers, (d) Division of two complex numbers.
8. Write an object oriented program (OOP) using C++ to exchange the private data members of two different functions using friend functions.
9. Write an OOP using C++ to count how many times a particular member function of a class is called by: (a) A particular object, (b) Any objects
10. Write an OOP using C++ to define a constructor for a "Date" class that initializes the Date objects with initial values. In case initial values are not provided, it should initialize the objects with default values.
11. Write an OOP using C++ to overload `==` operator to compare two strings.
12. Write an OOP using C++ to perform simple arithmetic operations of two complex numbers using operator overloading.
13. Write a C++ program to demonstrate how ambiguity is avoided using scope resolution operator in the following inheritance: (a) Single inheritance, (b) Multiple inheritance
14. Write a C++ Program to perform the swapping of two data items of integer, floating point number and character type with the help of function overloading.
15. Write a C++ program to generate a Fibonacci series by overloading: (a) Prefix Operator, (b) Postfix Operator.
16. Write a C++ program to access the private data of a class by non-member function through friend function where the friend function is declared: (a) in the location of public category, (b) in the location of private category, (c) within the scope of a class definition itself, (d) defined with inline code subtraction.
17. Write a C++ program to demonstrate how a pure virtual function is defined, declared and invoked from the object of derived class through the pointer of the base class.
18. Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file.
19. Write a program to copy the contents of one text file to another and display both the files using a text Menu.
20. Create a database of 10 students. The database should contain the Name, Marks of 5 subjects, Aggregate Marks, Aggregate percentage and Division according to the following conditions: (a) Percentage above or equal to 60 – First division, (b) Percentage between 50 and less than 60 – Second division, (c) Percentage between 40 and less than 50 – Third division, (d) Percentage below 40 – Improvement required  
Display the above database of every student in a tabulated form. Implement the above program using Structures, Text-Menu and File I/O operations.
21. Write an OOP using a class template to read any five parameterized data type such as float and integer, and print the average.
22. Write a C++ program to Bubble Sort using template function.
23. Write a C++ program to read two numbers and find the division of these two numbers using exception handling.
24. Write a C++ program to create a function which take a parameter, if the value of parameter is  $> 0$  then throw integer type, if parameter is  $= 0$ , then throw character type, if parameter is  $< 0$  then throws float type exception but for all design use only one catch block.
25. Write a C++ program for invoking, for that generate & handle exception.

## List of Equipment/Machine Required

Pentium IV machine, Turbo C++ compiler / gcc, windows / Linux environment

## Recommended Books :

1. Programming with C++ : D Ravichandran
2. OOP's with C++ : E. Balaguruswamy .
3. Programming with C++ : Venugopal .
4. Object Oriented Programming in C++ : Strout Strups.
5. OOP with C++ : Robert Lafore
6. Let us C++ : Yaswant Kanetkar.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Information Technology**

Subject: **Health, Hygiene & Yoga**

No. Of Periods: **2 Periods/Week**

**Maximum Marks: 40**

Semester: **IV**

Code: **333465(46)**

Total Tutorial Periods: **NIL**

**Minimum Marks: 24**

## Course Objectives:

- 1 To provide understanding the importance of health.
- 2 To provide insight into the hygiene aspect & quality of life.
- 3 To study the concepts of various medical therapy.
- 4 To practice the various yogasans.
- 5 To provide knowledge about common diseases and its cure through yagasans and pranayam.
- 6 To develop concentration through various methods.

**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 underrating, 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, Accupunture, 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 MateriaMedica 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, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:**Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:**Shirshpadasan, Shashankasan.
- **Asans for eye sight:**Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

**UNIT-V CONCENTRATION:** Concentration of mind and how to achieve it. **Tratak (त्राटक)**. Concentration on breath, **Japa (जप)**. **Ajapajap (अजपाजप)**, internal silence (**अन्तर्ध्यान**), visualization in mental sky (**विदाकाश धारणा**). Concentration on point of light (**ज्योति ध्यान**). Concentration on feeling (**भाव ध्यान**). Concentration on figure (**मूर्त ध्यान**).

## Text Books:

Health, Hygiene & Yoga, Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

## Reference Books:

- (1) Yogic MateriaMedica
- (2) Asan, Pranayam and Bandh.