Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami VivekanandaTechnical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

B. Tech Second Year (3rd semester)

Computer Science and Engg. / Computer Science and Engg. (Artificial Intelligence) / Computer Science and Engg. (Artificial Intelligence and Machine Learning) / Computer Science and Engg. (Data Science) / Computer Science and Engg. (Big Data Analytics) / Computer Science and Engg.(Internet of Things) / Computer Science and Engg. (Gaming Technology) / Computer Science and Engg. (Internet of Things and Cyber Security with Blockchain Technology)

S.N.	Board of Studies (BOS)	Courses(Subject	Course Code	Periods per week			Scheme of Exam			Total Marks	Credit
							Theory/Practical				
				L	T	P	ESE	CT	TA		
1	Applied Mathematics	Engineering Mathematics	AM100302	2	1	-	100	20	30	150	3
2	Comp. Sc. and Engineering	Object Oriented Programming with C++	CS102301	3	0	-	100	20	30	150	3
3	Comp. Sc. and Engineering	Data Structure	CS102302	2	1	-	100	20	30	150	3
4	Comp. Sc. and Engineering	Operating System	CS102303	3	0	-	100	20	30	150	3
5	Comp. Sc. and Engineering	Digital Electronics and Logic Design	CS102304	3	0	-	100	20	30	150	3
6	Comp. Sc. and Engineering	Object Oriented Programming with C++ Lab	CS102391	-	-	2	25	-	25	50	1
7	Comp. Sc. and Engineering	Data Structure Lab	CS102392	-	--	2	25	-	25	50	1
8	Comp. Sc. and Engineering	Operating System (Unix Lab)	CS102393	-	-	2	25	-	25	50	1
9	Comp. Sc. and Engineering	Mini Project-I	CS102394	-	-	2	25	-	25	50	1
10	Comp. Sc. and Engineering	Health Hygiene & Yoga	CS100395	-	-	2	-	-	25	25	1
11	Information Technology	Cyber Laws and Ethics	IT100396	-	-	-	-	-	25	25	-
Total				**13**	**2**	**10**	**600**	**100**	**300**	**1000**	**20**

Note:

(a)Abbreviations used:L-Lecture,T-Tutorial,P-Practical,ESE-EndSemesterExam,CT-ClassTest,TA-Teacher'sAssessment

(b)Thedurationofendsemesterexaminationofalltheorypaperswillbeofthreehours.

Shri Shankaracharya Technical Campus
(An Autonomous Institute affiliated to Chhattisgarh Swami VivekanandaTechnical University Bhilai)
SCHEME OF EXAMINATION AND SYLLABUS

Second Year (4th semester) B. Tech

Computer Science and Engg. / Computer Science and Engg. (Artificial Intelligence) / Computer Science and Engg. (Artificial Intelligence and Machine Learning) / Computer Science and Engg. (Data Science) / Computer Science and Engg. (Big Data Analytics) / Computer Science and Engg.(Internet of Things) / Computer Science and Engg. (Gaming Technology) / Computer Science and Engg. Internet of Things and Cyber Security with Blockchain Technology)

S.N.	Board of Studies (BOS)	Courses(Subject)	Course Code	Periods per week			Scheme of Exam			Total Marks	Credit
							Theory/Practical				
				L	T	P	ESE	CT	TA		
1	Applied Mathematics	Discrete Structure	AM100401	3	1	-	100	20	30	150	4
2	Comp. Sc. and Engineering	Computer System Architecture and Microprocessor	CS102401	2	1	-	100	20	30	150	3
3	Comp. Sc. and Engineering	Java Programming	CS102402	3	0	-	100	20	30	150	3
4	Comp. Sc. and Engineering	Analysis and Design of Algorithms	CS102403	3	0	-	100	20	30	150	3
5	Comp. Sc. and Engineering	Database Management System	CS102404	3	0	-	100	20	30	150	3
6	Comp. Sc. and Engineering	Java Programming Lab	CS102491	-		2	25	-	25	50	1
7	Comp. Sc. and Engineering	Python Lab	CS102492	-		2	25	-	25	50	1
8	Comp. Sc. and Engineering	Database Management System Lab	CS102493	-		2	25	-	25	50	1
9	Comp. Sc. and Engineering	Mini Project-II	CS102494	-		2	50	-	25	75	1
10	Applied Chemistry	Biology For Engineers	AC100495	-	-	-	-	-	25	25	-
Total				**14**	**2**	**8**	**625**	**100**	**275**	**1000**	**20**

Note:

(a)Abbreviations used:L-Lecture,T-Tutorial,P-Practical,ESE-EndSemesterExam,CT-ClassTest,TA-Teacher'sAssessment

(b)Thedurationofendsemesterexaminationofalltheorypaperswillbeofthreehours.

Subject Code	Engineering Mathematics AM100302	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 hrs

Course Objective	Course Outcomes
The objective of this course is to familiarize the prospective engineers with techniques in calculus of multivariable and infinite series expansion of continuous function as well as some statistical treatment of discrete functions. More precisely, the objectives are: 1. To instigate a thorough knowledge of partial differential equations which arise in mathematical descriptions of situations in engineering? 2. To develop the tool of Fourier series for learning advanced Engineering Mathematics. 3. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differential equations. 4. To originate a thorough study about random quantities and their description in terms of their probability. 5. To provide a thorough understanding interpolation.	**On successful completion of the course, thestudent will be able to:** **CO 1.** To have a thorough knowledge of PDE which arise in mathematical descriptions of situations in Engineering? **CO 2.** To make the students understand that Fourier series analysis is powerful methods where the formulas are integrals and to have knowledge of expanding periodic functions that explore variety of applications of Fourier series. **CO3.** To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differentials equations. **CO4.** To study about a quantity that may take any of a given range of values that can't be predicted as it is but can be described in terms of their probability **CO5.** To study the technique of estimating the values of a function for any intermediate value of the independent variable.

UNIT – I **[8 hrs]**

Partial differential equation: Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non- homogeneous linear equations, Method of separation of variables; Equation of vibrating string (wave equation).

UNIT – II **[7 hrs]**

Fourier Series- Euler's formula; Functions having point of discontinuity; Change of interval; Even and Odd function; Half range series; Harmonic Analysis.

UNIT – III Laplace transform: Definition; Transform of elementary functions; Properties of Laplace transform; Inverse Laplace Transform (Method of partial fraction, Using properties and Convolution theorem); Transform of Unit step function and Periodic functions; Application to the solution of ordinary differential equations.

UNIT – IV **[7 hrs]**

Probability distributions: Random variable; Discrete and continuous probability distributions; Mathematical expectation; Mean, Variance and Moments; Moment generating functions; Probability distribution (Binomial, Poisson and Normal distributions).

UNIT – V **[7 hrs]**

Interpolation with equal and unequal intervals: Finite difference, Newton's Forward and Backward Difference Formulae, Central Difference Formula, Sterling's Formula, Bessel's Formula, Lagrange's Formula and Newton's Divided Difference Formula**.**

Text Books:

S.No.	Title	Authors	publisher
1)	Higher Engineering Mathematics	Dr.B.S. Grewal	Khanna Publishers
2)	Numerical Methods in Engineering and Science	Dr.B.S. Grewal	Khanna Publishers
3)	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley &Sons
4)	Applied Engineering Mathematics	Madan MohanSingh	BS Publications

Reference Books:

S.No.	Title	Authors	publisher
1)	Calculus and Analyticgeometry	G. B. Thomas and R. L. Finney	Pearson, Reprint
2)	Engineering Mathematicsfor first year	T. Veerarajan	Tata McGraw- Hill, New Delhi
3)	Higher EngineeringMathematics	B. V. Ramana	Tata McGraw Hill New Delhi
4)	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications

B. Tech Second Year (3rd semester)

Subject Code	Object Oriented Programming with C++ CS102301	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 hrs

Course Objective	Course Outcomes
1. Understanding about object oriented programming. 2. Gain knowledge about the capability to store information together in an object. 3. Understand the capability of a class to rely upon another class. 4. Learn how to store one object inside another object and use of one method can be used in variety of different ways. 5. Create and process data in files using file I/O functions. 6. Understand about constructors which are special type of functions. 7. Learn how to write code in a way that it is independent of any particular type.	At the end of the course, a student will be able to: 1) Students will understand the concepts of flow of control, abstraction, pointer and recursion. 2) Analyse a simple programming problem specification. 3) Design a high-level solution to the problem using functional abstraction and general imperative programming language constructs. 4) Write, compile, execute and debug a C++ program which maps the high-level design onto concrete C++ programming constructs.

UNIT- I **[8 hrs]**

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, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging. Structure of C++ program with simple C++ program, Control structures, Function overloading, Function in C++ , the main function, Function prototyping, inline function.

UNIT-II **[7 hrs]**

Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifies, and static members, use of *const* keyword, friends function, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes**. String:** Concept of string, string, The standard C++ String class, Operations on Strings: length, capacity, resize, capacity, get line, begin, end, copy, swap etc.

UNIT- III **[7 hrs]**

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

UNIT-IV **[7 hrs]**

Operator Overloading: Overloading operators, rules for overloading operators, overloading of various operators, **Type Conversion:** 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, order of execution of constructors and destructors.

UNIT-V **[7 hrs]**

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

Text Books:

S.No.	Title	Authors	Publisher
1	Object Oriented Programming in C++	Lafore R	Waite Group
2	Object Oriented Programming with C++	E. Balagurusamy	Tata McGraw Hill

ReferenceBooks:

S. No.	Title	Authors	Publisher
1	Mastering Object-Oriented Programming with C++	R. S. Salaria	Salaria Publishing House.
2	The C++ Programming Language	Bjarne Stroustrup	Addison Wesley
3	The Complete Reference to C++ Language	Herbert Schildt	McGraw Hill-Osborne.

B. Tech Second Year (3rd semester)

Subject Code	Data Structure CS102302	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 hrs

Course Objective	Course Outcomes
To make students aware of efficient storage and systematic operations on data using data structure	CO1 Understand the concept of ADT CO2 Identify data structures suitable to solve problems CO3 Develop and analyze algorithms for stacks, queues CO4 Develop algorithms for binary trees and graphs CO5 Implement sorting and searching algorithms CO6 Implement symbol table using hashing techniques

UNIT-I **[8 hrs]**

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Small-Oh ,Omega , little Omega and theta. Time-Space trade-off. Abstract Data Types (ADT) Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations. Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

UNIT-II **[7 hrs]**

Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Post fix Expressions, Evaluation of post fix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

UNIT-III **[7 hrs]**

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees.

UNIT-IV **[7 hrs]**

Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transistive Closure and Shortest Path algorithm: Marshal Algorithm and Dijikstra Algorithm.

UNIT-V **[7 hrs]**

Searching: Sequential search, Binary Search, Complexity of Search Algorithm,Comparison and Analysis Internal Sorting:I nsertion Sort, Selection, Bubble Sort, Quick Sort,Two Way Merge Sort,Heap Sort, Radix Sort, Search Trees: Binary Search Trees(BST), Insertion and Deletion in BST, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees,
Hashing: Hash Function, Collision Resolution Strategies ,Storage Management: Garbage Collection and Compaction.

Text Books:

S.No.	Title	Authors	Publisher
1	Data Structures Using C and C/C++",	Aaron M. Tenenbaum, Yedidyah Langsamand Moshe J. Augenstein	PHI
2	Fundamentals of Data Structures	Horowitz and Sahani	GalgotiaPublication

Reference Books:

S. No.	Title	Authors	Publisher
1	An Introduction to Data Structures with applications	Jean Paul Trembleyand Paul G.Sorenson	McGrawHill
2	Data Structures and Program Design in C	R. Kruse etal	Pearson Education
3	Data Structures	Lipschutz	Schaum's Outline Series,TMH
4	Data Structures and Algorithms	G A V Pai	TMH

B. Tech Second Year (3rd semester)

Subject Code	Operating System CS102303	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 hrs

Course Objective	Course Outcomes
1. Students will learn how Operating System is Important for Computer System. 2. To make aware of different types of Operating System and their services. 3. To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. 4. To know virtual memory concepts. **5.** To learn secondary memory management.	**1.** To learn what is operating system and how it makes computers work. **2.** To know how operating system manages complexity through appropriate abstraction of CPU, memory, files, semaphores etc. **3.** To get knowledge about different components of operating system like Process Management, Concurrency mechanisms. **4.** To get knowledge about Deadlock handling, Memory Management techniques **5.** To get knowledge about Virtual Memory, File System **6.** To learn what is Secondary Storage Management, Security & protection etc. **7.** Students will be able to Work confidently in Unix/Linux environment. **8.** Students will understand different kernel algorithms and its usage.

UNIT- I **[8 hrs]**

INTRODUCTION: Operation System objective and function, The Evolution of operating Systems, Batch, interactive, time sharing and real time systems, Protection. Operating System Structure, System Components, operating system service, System structure. Distributed Computing, The Key Architecture Trend; Parallel Computation, Input-Output Trends.

UNIT-II **[7 hrs]**

CONCURRENT PROCESSES: Process concept: Introduction, Definitions of "Process", Process States, Process State Transitions, The process Control Block, Operations on Processes, Suspend and Resume, Interrupt Processing. Mutual Exclusion, the Producer / Consumer problem, the critical section problem, Semaphores, Classical problems in concurrency, inter process communication. Asynchronous Concurrent Process: introduction, parallel Processing, A Control Structure for indicating parallelism. CPU scheduling: concepts, performance criteria, and scheduling Algorithms. Algorithm evaluation, Multiprocessor scheduling.

UNIT- III **[7 hrs]**

DEAD LOCKS: System model, Deadlock characterization. Prevention, Avoidance and Detection, Recovery from deadlock, combined approach. **MEMORY MANAGEMENT:** Base machine, resident Monitor, multiprogramming with fixed partition, Multiprogramming with variable partitions, Paging, Segmentation, paged - segmentation, virtual Memory concepts, Demand paging, performance, page Replacement algorithms, Allocation of frames, Thrashing, cache memory organization impact on performance.

UNIT-IV **[7 hrs]**

I/O MANAGEMENT &DISK SCHEDULING: I/O device and the organization of the I/O function, I/O Buffering, Disk I/O, Operating system Design issues. File system: File Concepts – File organization and Access mechanism, File Directories, File sharing, Implementation issues.

UNIT-V **[7 hrs]**

FILE MANAGEMENT of UNIX OS: File Structures, System Calls for File Management system, INODES, Structure of Regular File, Directories,Conversions of a Path, name to an INODE, Super Block, INODE Assignment to a New File create, open, close, read, write, lseek, link, symlink unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

Text Books:

S.No.	Title	Authors	Publisher
1	Operating System concepts	Silberscatz A and Peterson	J.L, PE- LPE
2	Operating System Design & Implementation	Tanenbaum	A.S., PHI.
3	Operating system concepts Galvin	Silberscatz	John Weiley & Sons
4	Operating systems	H.M.Deital	Pearson Education

Reference Books:

S. No.	Title	Authors	Publisher
1	Operating System in Depth Design and Programming	Thomas Doeppner	Wiley India
2	Operating System Concept & Design	Milenkovic M	McGraw Hill
3	Operation System	Stalling William, Maxwell	MCMillan
4	Unix for programmers and users	Graham Glass, King Ables	Pearson education

B. Tech Second Year (3rd semester)

Subject Code	Digital Electronics and Logic Design CS102304	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	

Course Objective	Course Outcomes
1. To present the Digital fundamentals, Boolean algebra and its applications in digital systems. 2. To familiarize with the design of various combinational digital circuits using logic gates. 3. To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits. 4. To explain the various semiconductor memories and related technology. 5. To introduce the electronic circuits involved in the making of logic gates.	At the end of the course: 1. Use digital electronics in the present contemporary world. 2. Design various combinational digital circuits using logic gates. 3. Do the analysis and design procedures for synchronous and asynchronous sequential circuits. 4. Use the semiconductor memories and related technology. **5.** Use electronic circuits involved in the design of logic gates.

UNIT I **[8 hrs]**

DIGITAL FUNDAMENTALS: Number Systems – Decimal, Binary, Octal, Hexadecimal, Weighted & Non Weighted codes, Sequential Codes, 1‘s and 2‘s complements, Codes – Binary, BCD, Excess 3, Gray, 8-4-2-1BCD, Error Detecting/Correcting codes, Code conversions, Boolean theorems, Logic gates, Universal gates, Sum of products and Product of sums, Minterms and Maxterms, Karnaugh’s Map Minimization(up 4 terms) and Quine-McCluskey minimization(up 5 terms).Realization of functions using gates, Simulate the DMorgan’s Theoram and universal gates using Logisim Software.

UNIT II **[7 hrs]**

COMBINATIONAL CIRCUIT DESIGN: Design of Half and Full Adders, Half and Full Subtractors, Binary ParallelAdder – Carry look ahead Adder,Serial Adder, BCD Adder, Code Converter, Parity bit Generator/Checker. Decoders and Encoders, Multiplexer and Demultiplexer (up to 8 input/output), Multiplexer as universal logic function generator. Magnitude Comparator, Decoder, Encoder, Priority Encoder, Simulate all combinational circuits like adder, subtractor, multiplexer using Logisim software.

UNIT III **[7 hrs]**

SYNCHRONOUS SEQUENTIAL CIRCUITS: Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.Analysis anddesign of clocked sequential circuits – Design – Moore/Mealy models,state minimization, state assignment, Simulate the counter and shift register using Logisim software.

UNIT IV **[7 hrs]**

ASYNCHRONOUS SEQUENTIAL CIRCUITS: Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT V **[7 hrs]**

MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS: Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static and dynamic RAM – Programmable Logic Devices – Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL.**Digital integrated circuits:** Logic levels, propagation delay, power dissipation, fan-out and fan-in, noisemargin, logic families and their characteristics-RTL, TTL, ECL, CMOS.

Case Study: Recent Memory Devices and their specifications

Text Books:

S.No.	Title	Authors	Publisher
1	Modern digital Electronics	R.P. Jain	Tata McGraw Hill
2	Digital Electronics- An introduction to theory and practice	W.H. Gothmann	PHI
3	Digital Circuits and Systems	D.V. Hall	Tata McGraw Hill, 1989
4	Digital Fundamentals	Floyd & Jain	Pearson Education
5	Digital Electronics	A. P. Malvino	Tata McGraw Hill

Reference Books:

S. No.	Title	Authors	Publisher
1	Modern digital Electronics	R.P. Jain	Tata McGraw Hill
2	Digital Electronics- An introduction to theory and practice	W.H. Gothmann	PHI
3	Digital Circuits and Systems	D.V. Hall	Tata McGraw Hill, 1989
4	Digital Fundamentals	Floyd & Jain	Pearson Education
5	Digital Electronics	A. P. Malvino	Tata McGraw Hill

B. Tech Second Year (3rd semester)

Subject Code	Object Oriented Programming with C++ Lab CS102391	L = 0	T =0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	25	-	25		-

Course Objective	Course Outcomes
The objective of course is to develop programming skills of students, using object oriented programming concepts, learn the concept of class and object using C++ and develop classes for simple applications.	Upon successful completion of this Lab the student will be able to: 1. You will be able to know about Object oriented programming. 2. Use Abstract Data Types in the programs. 3. Application of Non recursive functions. 4. OOP principles like Encapsulation Inheritance Polymorphism were frequently used. 5. Different sorting techniques (Quick sort, Merge sort, Heap sort)were used. 6. Polymorphism and exception handling in the programs.

List of Experiments: [12 hrs]

(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
3. numbers by using switch-case statements.
4. 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) *dowhile*
5. loop
6. Write a Program to find sum of the following series using function declaration:
   Sum= x-(x)3/3!+(x)5/5!-……..(x)n/n!
7. Write a Program to read the element of the given two matrixes & to perform the matrix multiplication.
8. Write a Program to exchange the contents of two variables by using (a)Call by value, (b)Call by reference.

9. Write a Program to perform the following arithmetic operations of a complex number using astructure: (a) Addition of two complex numbers, (b) Subtraction of two complex numbers, (c) Multiplication of two complex numbers, (d) Division of two complex numbers.
10. Write an object oriented program (OOP) using C++ to exchange the private data members of two different functions using friend Functions.
11. 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
12. 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.

B. Tech Second Year (3rd semester)

Subject Code	Data Structure Lab CS102392	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	25	-	25	-	-

Course Objective	Course Outcomes
The goals of the course are to develop the basic programming skills in students, and to improve their proficiency in applying the basic knowledge of programming to solve problems related to their field of engineering.	CO1 Develop ADT for stack and queue applications CO2 Implement tree and graph algorithms CO3 Implement and analyze internal and external sorting algorithms CO4 Design and implement symbol table using hashing technique

List of Experiments : [12 hrs]

(At least ten experiments are to be performed by each student)

1. Write a program to perform following operations in one dimensional array, Insertion, Deletion
   and Searching (Linear & Binary).
2. Write a program to implement stack and perform push and pop operations.
3. Write a program to convert infix to postfix expressions using stack.
4. Write a program to perform following operations on a linear queue-addition, deletion, traversing.
5. Write a program to perform following operations on a circular queue-addition, deletion, traversing.
6. Write a program to perform following operations on a double ended queue-
   addition, deletion, traversing.
7. Write a program to perform following operations on a single link list-creation, inversion, deletion.
8. Write a program to perform following operations on a double link list–creation, insertion, deletion.
9. Write a program to perform implement polynomial in link list and perform.
   a) Polynomial arithmetic b)Evaluation o f polynomial

10. Write a program to perform implement a linked stack and linked queue.
11. Write a program 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 aprogramtocreateaBinarysearchtreeandperform–insertion,deletion&traversal.
16. Write a program to traversal of graph(B.F.S,D.F.S)

B. Tech Second Year (3rd semester)

Subject Code	**Operating System (Unix Lab) CS102393**	**L = 0**	**T = 0**	**P = 2**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**-**	**ESE Duration**
	25	**-**	**25**	**-**	**-**

Course Objective	**Course Outcomes**
The objectives of this lab is : 1. To familiarize students with the architecture of Unix OS. 2. To provide necessary skills for developing and debugging programs in UNIX environment.	**CO1** Students will be able to Work confidently in Unix/Linux environment **CO2** Students will able to Write shell scripts to automate various tasks **CO3** Students will understand different commands on Unix and its usage **CO4** Students will be able to describe and use the fundamental UNIX system tools and utilities **CO5** Students will understand different kernel algorithms and its **usage** **CO6** Students will understand different flavors' of UNIX and their importance

Note: Use Bash for Shell scripts.

List of Experiment to be performed [12 hrs]

1. Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip
2. Unix Commands- FILTERS: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters , Words or Lines, Comparing Files.
3. Unix Commands – grep, egrep, sed, awk
4. a. Write a shell script to accept three numbers and display the largest.
   b. Write a shell script to find the number of files in a directory.
5. a. Write a shell script to display first ten positive numbers using until loop
   b. Write a shell script to check whether a file is existing or not.
6. a. Write a shell script to find the mode of a file in a directory.
   b. Write a shell script which will accept different numbers and find their sum.

7. a. Write a menu driven program to display a menu of options and depending upon the user's choice execute the associated command.
   b. Write a shell script to print the first 10 odd numbers using the while loop.
8. a. Write a shell script to check if a particular user has logged in or not. If not, continue the loop till he/she logins. Once the required user logins, display a message.
   b. Write a shell script to reverse the digits of a given number.
9. a. Write a shell script to list all of the directory files in a directory.
   b. Write a shell script to find factorial of a given integer.
10. a. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
11. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
12. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
13. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
14. a. Write a shell script to accept the name, grade, and basic salary from the user. Write the details into a file called employee, separating the fields with a colon (,) continue the process till the user wants.
    b. Write a shell script to calculate the total salary payable to all the employees from the employee file. The salary should be taken from the 8th field of the employee file.
15. a. Write an awk script to count the number of lines in a file that do not contain vowels.
    b. Write an awk script to find the number of characters, words and lines in a file
16. a. Write a script to print fibonacci series.
    b. Write a script to print the input number is prime or not.

B. Tech Second Year (3rd semester)

Subject Code	Mini Project-I CS102394	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	25	-	25		-

Course Objective	Course Outcomes
The objectives of this lab is : The objective of this course is to improve student's ability to analyze, design and solve complex engineering problems through pedagogies **(Project Based Learning)** that support them in developing these skills. The goal here is not to passively absorb and reiterate information; but rather to actively engage with the content, work through it with others, relate to it through an analysis, use modern tools and effectively solve problems with the corresponding knowledge gained.	**On successful completion of the course, the student will be able to:** **CO1:** Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. **CO2:** Reproduce, improve and refine technical aspects of engineering projects applying appropriate techniques, resources, and modern engineering and IT tools. **CO3:** Work as an individual and as a member or leader in teams in development of technical projects. **CO4:** Follow management principle and value health, safety and ethical practices during project. **CO5:** Communicate and report effectively project related activities and findings.

The Process Followed to Maintain the Quality of Student Projects are: [12 Hrs]

(a) Allotments of Projects

(b) Project Identification

(c) Continuous Monitoring

(d) Evaluation

(a) Allotment of Projects:

(i) Students form their team (max four students) and submit their areas in which they wouldlike to pursue their projects.

(ii) Through meeting and deliberations students are allotted guide depending on their preference and maximum number of groups under a faculty is limited to three.

(b) Identification of projects:

Students are asked to formulate problem statement and state objectives of their project in consultation with the project guide.

(c) Continuous Monitoring

(i) Progress is continuously monitored by guide and instructions are given how to proceed further during their project periods as per time table.

(ii) Students submit weekly progress report to the project in-charge after consultation withtheir project guide.

(d) Evaluation

(i) In order to evaluate projects two project seminars (assessment) are taken in which student's team present their project through presentations and demonstrate their work.

(ii) Students are assessed on the basis of their technical skill implementation, use of modern tools, communication skill, team work, health, safety and ethical practices and relevance of the project.

(iii) At the end of the semesters a report is submitted by the students and student's projects are finally evaluated by external examiner in end semester practical examination based

B. Tech Second Year (3rd semester)

Subject Code	Health Hygiene & Yoga CS100395	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	25	-	25		-

Course Objective	Course Outcomes
1. To provide understanding and importance of health 2. To provide insight into the hygiene aspect and quality of lifestyle 3. To study the concepts of various medical therapy 4. To practice different types of yogasan and pranayama. 5. To provide knowledge about common diseases and its cure through yogasan and pranayama. To develop and improve concentration through various methods	On successful completion of the course, the student will be able to: **CO 1**. Demonstrate a better understanding about mental and physical health for human life **CO 2**.Understand the correlation of mental and physical health with hygiene and yoga **CO 3**. Demonstrate the understanding about the health hazards resulting due to improper lifestyle **CO 4**. Display understanding about eminent yogis and primary texts on yoga **CO 5**. Apply various techniques of yoga to counter various lifestyle issues **CO 6.** Understand the utility of health, hygiene and yoga for society welfare

UNIT – I: CO 1

(A) Health:

- Concept of Health – Physical and Mental Health and Wellbeing
- Meaning and definition of Health according to WHO and Ayurveda Charaksamhita
- Primary Health Care –Food, Nutrition and Cleanliness
- Human Psychology and Health Consciousness

(B) Hygiene:

- Meaning, definition and importance of Hygiene in life
- Types of Hygiene and general rules for Hygiene and Cleanliness
- Ayurveda: Ayurveda, Vata, Pitta and Cough

UNIT – II: CO 2

(A) Medicinal Cure:

- Introduction and basic concepts of common streams of medicinal cure
- Introductory knowledge about modes of operation of Alopathy, Ayurveda, Homoeopathy, Bio-chemic, Unani, Siddha, Acupressure, Acupuncture and Naturopathy
- Introduction of Anatomy and Physiology concerned

(B) Occupational Health:

- Diseases and their occupational relevance, risk factors for deficiency diseases
- Drugs, Tobacco, Alcohol and Food intoxication: chemical agents, side effects and control measures
- Stress, anxiety, depression and emotional imbalance: causes and prevention

(C) Modern Silent Killers:

- High blood pressure, diabetes and cancer – causesand cure
  Common health problems due to stomach disorders such as indigestion, acidity, etc.

UNIT – III:

(A) Yogasans:

- Meaning, concept and importance of Yoga for healthy life
- Yogasans and its mode of operation, Prone and Supine Posture
- Common Yogasans such as Bhujangasan, Halasan, Padmaasan, Sarvangasan, Shavasan, Surya Namaskar, Utshep Mudra, Vajrasan, Jal-Neti, etc.
- Asans for Brain: Shirshpadasan, Shashankasan
- Asans for Eye Sight: Tratak, Neti-Kriya

(B) Yogis and Yogic Texts:

- Ashtang yoga from Patanjali Yoga Sutra
- Somantic and Psychosomatic from YogVashishth
- BhagwadGeeta
- Basic knowledge of Shat Darshan

UNIT – IV:

(A) Pranayama:

- Definition, concept and types of Pranayama
- NadiShodhan, AnulomVilom, Bhastrika, Bhramari,Shitakari, etc.
- Usefulness of Pranayamafor students
- Introduction to Kumbhak

(B) Meditation:

- Basic concept of Meditation
- Concentration of mind: Dhyan
- Concentration on breath; Japa, Ajapajap, Internal Silence
- Concentration on point of light, Concentration on feeling, Concentration on figure
- Visualization in mental sky

UNIT-V: Cyber Ethics:

Social Awareness and Community Health:

- NSS / NCC activities for society and nation
- Health and family welfare
- Nutrition and welfare programmes for childs, elders and divyangs
- Blood Donationand health check-up campaign
- Green environment campaign - Plantation
- Co-management of HIV and TB diseases
- Gender Equity and National Integrity
- Natural calamities and Disaster Management
- Road safety awareness, Swachhataaawareness, etc.

Text Books:

S. No.	Title	Authors	Publisher
1)	Health, Hygiene & Yoga	Dr P. B. Deshmukh;	Gyan Book Private Ltd. New Delhi
2)	Health, Hygiene and Yoga	Dr. Manju Shukla	Gyan Book Private Ltd. New Delhi

Reference Books:

S. No.	Title	Authors	Publisher
1)	Asan Pranayama Mudrabandha	Swami SatyanandaSaraswati	Yoga Publication Trust, Munger (Bihar)
2)	Fundamentals of Yogic Practices - A Complete Guide on Yoga	Shrikant, R. Kushwah, Y. Kushwah	KhelSahitya Kendra, Delhi

B. Tech Second Year (3rd semester)

Subject Code	Cyber Laws and Ethics IT100396	L = 0	T = 0	P = 0	Credits = 0
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	-	-	25	-	-

Course Objective	Course Outcomes
1. To explore brief idea about the CYBER LAWS. 2. To get the basic idea about IT ACT. 3. Awareness about ecommerce and related cyber laws. 4. Awareness regarding Trademarks, Copyrights and Patents. 5. Awareness regarding Cyber Ethics.	**After the completion of course, student will be** **CO 1**. Understand Cyber laws **CO 2**. Understand IT Act. **CO 3**. Describe Information Technology act and Related Legislation. **CO 4**. Demonstrate Electronic business and legal issues. **CO 5**. Interpret Cyber Ethics.

UNIT – I: Introduction to Cyber law: CO 1

Evolution of computer Technology, emergence of cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, CyberspaceWeb space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

UNIT – II: Information Technology Act: CO 2

Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

UNIT – III: Cyber law and Related Legislation: CO 3 Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code.

UNIT – IV: Electronic Business and legal issues:
Evolution and development in E-commerce, paper vs paper less contracts E-Commerce models- B2B, B2C, E security. Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends.

UNIT-V: Cyber Ethics:
The Importance of Cyber Law, Significance of cyber Ethics, Need for Cyber regulations and Ethics. Ethics in Information society, Introduction to Artificial Intelligence Ethics: Ethical Issues in AI and core Principles, Introduction to Block chain Ethics

Text Books:

S. No.	Title	Authors	Publisher
1)	Cyber Laws: Intellectual property & E Commerce, Security	Kumar K	dominant Publisher
2)	Cyber Ethics 4.0, Christoph Stuckelberger	Pavan Duggal	Globethic
3)	Information Security policy & Implementation Issues	NIIT	PHI
4)	Computers, Internet and New Technology Laws	Karnika Seth	Lexis Nexis Butterworths Wadhwa Nagpur

Reference Books:

S. No.	Title	Authors	Publisher
1)	Legal Dimensions of Cyber Space	Verma S, K, Mittal Raman	Indian Law Institute, New Delhi
2)	Cyber Law	Jonthan Rosenoer	Springer, New York, (1997)
3)	The Information Technology Act 2005	A Handbook	OUP Sudhir Naib,, New York, (2011)
4)	Information Technology Act, 2000	S. R. Bhansali	University Book House Pvt. Ltd., Jaipur (2003)
5)	Cyber Crimes and Law Enforcement	Vasu Deva	Commonwealth Publishers, New Delhi, (2003)