SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai)

SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Information Technology) Third Semester

Sl. No.	Board of Studies (BOS)	Courses	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
				L	T	P	Theory/Lab				
							ESE	CT	TA		
1	Basic Sciences	Engineering Mathematics	AM100302	2	1	-	100	20	30	150	3
2	Information Technology	Digital Electronics	IT106301	2	1	-	100	20	30	150	3
3	Information Technology	OOPS	IT106302	3	-	-	100	20	30	150	3
4	Information Technology	Computer Organization and Architecture	IT106303	3	-	-	100	20	30	150	3
5	Information Technology	Data Structures & Algorithm	IT106304	3	-	-	100	20	30	150	3
6	Information Technology	Digital Electronics Lab	IT106391	-	-	2	25	-	25	50	1
7	Information Technology	Programming in Python Lab	IT106392	-	-	2	25	-	25	50	1
8	Information Technology	Data Structure & Algorithm Lab	IT106393	-	-	2	25	-	25	50	1
9	Information Technology	Mini Project - I (J2EE) JAKARTA EE	IT106394	-	-	2	25	-	25	50	1
10	Information Technology	**Health Hygiene & Yoga**	IT100395	-	-	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.

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SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Information Technology) Forth Semester

Sl. No.	Board of Studies (BOS)	Courses	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
							Theory/Lab				
				L	T	P	ESE	CT	TA		
1	Basic Science Courses	Discrete Structure	AM100401	3	1	-	100	20	30	150	4
2	Information Technology	Programming in JAVA	IT106402	2	1	-	100	20	30	150	3
3	Information Technology	Computer Networks	IT106403	3	-	-	100	20	30	150	3
4	Information Technology	Design & Analysis of Algorithms	IT106404	3	-	-	100	20	30	150	3
5	Information Technology	Data Base Management System (DBMS)	IT106405	3	-	-	100	20	30	150	3
6	Information Technology	Programming in JAVA Lab	IT106491	-	-	-	25	-	25	50	1
7	Information Technology	Design & Analysis of Algorithms Lab	IT106492	-	-	2	25	-	25	50	1
8	Information Technology	Data Base Management System Lab	IT106493	-	-	2	25	-	25	50	1
9	Information Technology	Mini Project - II (Flask/Jango)	IT106494	-	-	2	50	-	25	75	1
10	Chemistry	**Biology for Engineers**	AC10095	-	-	2	-	-	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.

SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI
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Scheme of Examination and Syllabus 2021
Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

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

Course Objectives	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, the student 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 ordinarydifferentials 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 : Partial differential equation: CO1
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). [8 Hrs]

UNIT – II : Fourier Series: CO2
Euler's formula; Functions having point of discontinuity; Change of interval; Even and Odd function; Half range series; Harmonic Analysis. [7 Hrs]

UNIT – III : Laplace transform: CO3
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 thesolution of ordinarydifferential equations. [7 Hrs]

UNIT– IV : Probability distributions: CO4
Random variable; Discrete and continuous probability distributions; Mathematical expectation; Mean, Variance and Moments; Moment generating functions; Probability distribution (Binomial, Poisson and Normal distributions). [7 Hrs]

UNIT – V : Interpolation with equal and unequal intervals: CO5
Finite difference ,Newton's Forward and Backward Difference Formulae,Central Difference Formula,Stirling's Formula, Bessel's ormula, Langrange's Formula and Newton's Divided Difference Formula. [7 Hrs]

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

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 EngineeringMathematics	Erwin Kreyszig	John Wiley &Sons
4)	Applied EngineeringMathematics	Madan MohanSingh	BS Publications

Reference Books:

S. No.	Title	Authors	Publisher
1)	Calculus and Analyticgeometry	G. B. Thomasand 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

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Scheme of Examination and Syllabus 2021
Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

Subject Code IT106301	Digital Electronics	L = 3	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To explore brief idea about the different digital circuits which are used to develop the digital devices. 2. To motivate the students to develop their logic to design different combinational ckts. 3. To motivate the students to develop their logic to design different sequencial ckts. 4. To motivate our students to use these digital circuits in integrated circuit design using VLSI. 5. Understand the concepts of Memories, Programmable Logic Devices & Digital ICs.	**After the completion of course, student should be** **CO 1**. Able to design Digital Ckts. **CO2**. Able to design & Implement Various Combinational Ckts. **CO 3**. Synchronous and Asynchronous counters. **CO 4** .Able to analyze Sequencial Ckts. **CO5.** Implement different Memory devices and Digital Integrated Circuits:

UNIT – I : Logic Gates & Minimization Techniques: CO1
Basic and Universal logic Gates, Realization of switching functions using gates. Binary codes: Weighted & Non-weighted codes: 8-4-2-1 BCD code, Excess-3 code, Gray code; Code Conversion: Binary to Gray and Gray to binary code conversion etc., Error detecting/correcting code: Parity, 7-bit Hamming code. Binary Arithmetic, Function Minimization Techniques: Demorgan's Theorem, Karnaugh's Map Method (Up to 4 variables), Quine-McCluskey's Method (Up to 6 variables). [8 Hrs]

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UNIT – II : Combinational Circuits: CO2
Adder & Subtractor: Half adder, Full adder, Half - subtractor , Full- subtractor, Parallel Binary adder, Look Ahead carry adder, Serial adder, BCD adder. Code converter, Parity bit generator/Checker, Magnitude Comparator (Up to 2 bit). Decoder: 3-line to 8-line decoder, 8-4-2-1 BCD to Decimal decoder, BCD to Seven segment decoder. Encoder: Octal to binary and Decimal to BCD encoder. Multiplexer: 2- input multiplexer, 4-input multiplexer. Demultiplexer: 1-line to 4-line, study of Multiplexer as Universal Logic Function Generator. [7 Hrs]

UNIT – III : Sequential Circuits: CO3
Difference between Sequential & Combinational Circuits, Latches(S-R Latch, D Latch) and Flip-Flops JK F/F, Master- Slave and Edge triggered Flip-Flops; Characterstics / Excitation Tables, Flip/ Flop Conversions. Introduction to registers: BUFFER register, Shift Registers (PIPO, SIPO, PISO, SISO, Bi-Directional Shift Registers), counters : Synchronous and Asynchronous counters and Designing of sequential circuits: code converter and counters. Mode-k and divide by K counters, Counter applications. [7 Hrs]

Subject Code IT106301	Digital Electronics	L = 3	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

UNIT – IV : Analysis of Sequential Circuits: CO4
Moore and Meely ckts, Analysis of clocked sequencial Circuits : State Table, State Diagra m, State Equation, State Reduction, State Assignment, Flip flop excitation Table, Design procedure. [7 Hrs]

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UNIT-V : Memory devices and digital integrated circuits : CO5
Basic memory structure and designing of ROM, Programmable Logic Devices : Programmable Logic Array (PLA), Programmable Array Logic (PAL). Implementation of combinational logic circuits using PLA,PAL.
Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in, logic families and their characteristics- RTL, DTL, open collector and totem pole TTL. [7 Hrs]

Text Books:

S. No.	Title	Authors	Publisher
1)	Fundamental of Digital Circuits	A. Anand Kumar	PHI (2nd Edition)
2)	Digital logic and computer design	M.M. Mano	PHI
3)	Digital Electronics	A.P. Godse, D.A.Godse,	Technical Publication
4)	Modern Digital electronics	R. P. Jain:	TMH
5)	Digital Electronics & Logic Design	B. Somanathan Nair	Prentice-Hall of India

Reference Books:

S. No.	Title	Authors	Publisher
1)	Digital System principles and Applications	R J Tocci	Prentice Hal
2)	Digital Electronics	A.K.Maini	Wiley India
3)	Pulse, Digital and Switching Waveforms	MillmanTaub,	TMH
4)	Digital Integrated Electronics	H. Taub and D. Schilling	McGraw Hill, 1977
5)	Digital fundamentals	Floyd	UBS

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B.Tech (3rd Semester – Information Technology)

Subject Code IT106302	OBJECT ORIENTED PROGRAMMING III	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To gain a better understanding of object-oriented design and program implementation by using object- oriented language features of C++. 2. Understand an object-oriented software development methodology. 3. To Understand the basic concept of Late binding, Templates and Exception Handling. 4. To Understand the concept of File Handling. 5. To use object-oriented modeling techniques and methodologies to produce requirements specificationdocuments.	**On successful completion of the course, the student will be able to:** **CO 1.** Understand object-oriented programming features in C++. **CO2.** Apply the features like Polymorphism and Inheritance to program design and implementation **CO3.** Understand the concepts of Late binding and Exception Handling **CO4**. Understand and apply the files concepts in OOPS **CO5**. Understand the Object Oriented Analysis and Design modeling.

UNIT –I : Introduction to Object Oriented Concepts: CO 1

Data hiding, Encapsulation, Data abstraction, Classes and objects, Scope of a class and its members , Nested Class, Constructors: parameterized constructor, multiple constructor, default constructor, copy constructor, destructor function, passing objects as function arguments, returning objects, array of objects, object pointer, new and delete operators, inline functions. [8 Hrs]

UNIT–II : Polymorphism and Inheritance: CO 2

Polymorphism, Function overloading, default arguments, Operator overloading: unary, binary, friend function, Inheritance, Inheritance: Single inheritance, multilevel inheritance, Hierarchical inheritance, Hybrid Inheritance, Multiple inheritance, container classes. [7 Hrs]

UNIT –III : Late binding, Templates and Exception Handling: CO 3

Virtual base classes, pointers to base and derived classes, virtual functions, pure virtual functions, virtual base classes, early and late binding, introduction to templates, function and class templates, exception handling. [7 Hrs]

UNIT –IV : Formatting and working with Files: CO 4

Formatted I/O with manipulators, formatting with ios class, streams and files, file modes, writing and reading objects on a file, random access of files, updating file. [7 Hrs]

UNIT –V : Object Oriented Analysis and Design: CO 5

OOA and OOD, Three models – Object, Dynamic and Functional. Object modeling – objects and classes, links, associations, generalization and inheritance. Dynamic modeling - Events and states, operations, nested state diagrams, concurrency. Functional modeling- functional models, example of functional model, relation of functional to object and dynamic models, OMT methodology. [7 Hrs]

Subject Code IT106302	**OBJECT ORIENTED PROGRAMMING III**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Text Books:

S. No.	Title	Authors	Publisher
1)	Mastering C++	K.R.Venugopal, RajKumar and T.RaviShankar	TMH
2)	C++ Complete reference	H. Schildt	TMH
3)	Object - Oriented modeling and design	J.Rumbaugh, M.Blaha	PHI

Reference Books:

S. No.	Title	Authors	Publisher
1)	Object Oriented Programming with C++	Balaguruswami	TMH,BPB
2)	Object Oriented Programming in Turbo C++	Robert Lafore	Galgotia Pub
3)	Object Oriented Analysis and Design	GradyBooch	Pearson.
4)	C++ Primer plus	Stephen Prata	Galgotia Pub

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Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

Subject Code IT106303	COMPUTER ORGANIZATION & ARCHITECTURE	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. How Computer Systems work & find the basic principles , Instruction Level Architecture and Instruction Execution. 2. The current state of art in memory system design 3. How I/O devices are accessed and its principles. 4. To provide the knowledge on Instruction Level Parallelism 5. To impart the knowledge on micro programming & Concepts of advanced pipelining techniques. .	**On successful completion of the course, thestudent will be able to:** **CO1**. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. **CO2**. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication). **CO3**. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process. **CO4**. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU. **CO5.** Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.

Unit-I: Functional blocks of a computer: CO1
CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU–registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
Case study – instruction sets of some common CPUs. [8 Hrs]

Unit-II : Data representation: CO2
signed number representation, fixed and floating point representations, character representation.
Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication- shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic. [7 Hrs]

Unit-III : Introduction to x86 architecture: CO3
CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of A simple hypothetical CPU.
Memory system design: semiconductor memory technologies, memory organization.
Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers- program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes–role of interrupts in process state transitions, I/O device interfaces – SCII, USB. [7 Hrs]

Unit-IV : Pipelining: CO4
Basic concepts of pipelining, throughput and speedup, pipeline hazards.
Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache oherency. [7 Hrs]

Unit-V : Memory organization: CO5
Memory interleaving, concept of hierarchical memory organization,
cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies. [7 Hrs]

Subject Code IT106303	**COMPUTER ORGANIZATION & ARCHITECTURE**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Text Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	"Computer Organization and Design: The Hardware/Software Interface",	5th Edition by L. Hennessy, David A. Patterson and John	Elsevier.
2)	"Computer Organization and Embedded Systems",	6th Edition by Carl Hamacher	McGraw Hill Higher Education

Reference Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	"Computer Architecture and Organization", ,	3rd Edition by John P. Hayes	WCB/McGraw-Hill
2)	"Computer Organization and Architecture: Designing for Performance".	10th Edition by William Stallings	Pearson Education
3)	"Computer System Design and Architecture"	2nd Edition by Vincent P. Heuring and Harry F. Jordan	Pearson Education

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Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

Subject Code **IT106304**	**DATA STRUCTURES AND ALGORITHM ANALYSIS**	**L = 2**	**T = 1**	**P = 0**	**Credits =3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Course Objectives	**Course Outcomes**
1. Introduce data organization and fundamental concepts of Data Structures. 2. Introduce basic operations on linear and non-Linear data structures 3. Introduce searching, sorting techniques 4. Analyze performance of algorithms. 5. Learn how concepts of data structures are useful in problem solving	After successful completion if this course, the students will be able to- **CO1**.Distinguish between different types of data structures such as stacks, queues and linked lists and their application on real world problems. **CO2**.Perform Comparative study of algorithms for searching and sorting and to select the best one on the basis of performance analysis of different algorithms for real world problems. **CO3**.Identify and design algorithmic solutions for different real-world problems and then analyze them using different performance analysis parameters and techniques **CO4**.Examine the different aspects of Binary Trees and make use of these concepts to efficiently allocate memory for Binary, AVL, B-tree, m-way search trees. **CO5**.Illustrate techniques to fully depict Graphs and identify the optimum ways for arrangement of nodes.

Unit -I : Introduction: Basic Terminology: CO1
Elementary Data Organization, Abstract Data Types (ADT) Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays, Application of arrays, Sparse Matrices and their representation, Sequential search, Binary Search, Comparison and Analysis of Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix Sort. [8 Hrs]

Unit-II : Stack & Queue: CO2
Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue. [7 Hrs]

Unit-III : Linked List : CO3
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, Hashing: Hash Function, Collision Resolution. [7 Hrs]

Unit -IV : Tree : CO4
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, Tree Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees, Traversing Threaded Binary trees. Binary Search Trees (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, ntroduction to m-way Search Trees, B Trees & B+ Trees. [7 Hrs]

Unit-V : Graph : CO5
Terminologies, 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. Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm. [7 Hrs]

Subject Code **IT106304**	**DATA STRUCTURES AND ALGORITHM ANALYSIS**	**L = 2**	**T = 1**	**P = 0**	**Credits = 3**
Evaluation Scheme	ESE	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

Text Books:

S. No.	Title	Authors	Publisher
1)	Fundamentals of Data Structures	Horowitz and Sahani	Galgotia Publication
2)	Data Structures Using C and C++	Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein	PHI Publications
3)	An Introduction to Data Structures with applications	Jean Paul Trembley and Paul G. Sorenson	McGraw Hill Publications

Reference Books:

S. No.	Title	Authors	Publisher
1)	Data Structures and Program Design in C	R. Kruse et al	Pearson Education
2)	Data Structures	Lipschutz, Schaum's Outline Series	TMH

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Subject Code IT106391	Digital Electronics Laboratory	L =0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	--------

Course Objectives	Course Outcomes
1. To explore brief idea about the different digital circuits which are used to develop the digital devices. 2. To motivate the students to develop their logic to design different combinational ckts. 3. Enabling students to take up application specific sequential circuit to specify the finite state machine and designing the logic circuit. 4. To motivate the students to develop their logic to design new digital circuits usable for hardware design. 5. To motivate our students to use these digital circuits in integrated circuit design using VLSI.	**After the completion of course, student should be** **CO 1**. Able to Verify and analyze the practical digital circuits. **CO 2**. Able to design & Implement Various Combinational Ckts. **CO 3**. Able to design Synchronous and Asynchronous counters & Implementation in sequencial ckts. **CO 4**. Able to analyze Sequencial Ckts. **CO 5**. Implement different Memory devices and Digital Integrated Circuits:

List of Experiments: (At least Ten experiments are to be performed by each student) [24 Hrs]

1. Realization of NOT, OR, AND, XOR, XNOR gates using universal gates
2. To study and prove Demorgan's Theorem .
3. To design half and Full adder circuits using logic gates.
4. To design half and full subtractor circuits using logic gates.
5. To design a binary parallel adder.
6. To design 4 bit magnitude comparator circuits.
7. To design a combinational circuit to drive seven-segment display.
8. To design 4:16 decoder using two 3:8 decoder and four 2:4 decoders.
9. To design & Implement 16: 1 multiplexer using 4:1 Multiplexers.
10. Realization of RS, JK, and D flip flops using Universal logic gates & ICs.
11. To design Mode-N and divide by K counter & also Implement Mod 5 Counter.
12. To construct Code convertor for conversion between BCD and EXCESS-3, a 4 bit binary to gray and vice versa using IC 7486 .
13. To study Up-Down counter.
14. To study programmable shift registers.

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B.Tech (3rd Semester – Information Technology)

Subject Code IT106391	Digital Electronics Laboratory	L =0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	--------

Text Books:

S. No.	Title	Authors	Publisher
1)	Fundamental of Digital Circuits	A. Anand Kumar 2nd Edition	PHI
2)	Digital logic and computer design	M.M. Mano	PHI
3)	Digital Electronics	A.P. Godse, D.A.Godse,	Technical Publication
4)	Modern Digital electronics	R. P. Jain:	TMH
5)	Digital Electronics & Logic Design	B. Somanathan Nair	Prentice-Hall of India

Reference Books:

S. No.	Title	Authors	Publisher
1)	Digital System principles and Applications	R J Tocci	Prentice Hal
2)	Digital Electronics	A.K.Maini	Wiley India
3)	Pulse, Digital and Switching Waveforms	MillmanTaub,	TMH
4)	Digital Integrated Electronics	H. Taub and D. Schilling	McGraw Hill, 1977

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Second Year B.Tech.(IT)
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Subject Code IT106392	PYTHON PROGRAMMING LAB	L=0	T=0	P=2	Credits=1
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	----------

Course Objectives	Course Outcomes
The aim of Python Programming Lab is 1.To acquire programming skills in core Python. 2.To acquire Object Oriented Skills in Python 3.To develop the skill of designing Graphical user Interfaces in Python 4.To develop the ability to write database applications in Python 5. To solve real life problem using AI,ML techniques.	**On successful completion of the course, the student will be able to:** **CO 1.**By the end of this lab, the student is able to Write, Test and Debug Python Programs **CO 2.** Use Conditionals and Loops for Python Programs **CO 3.** Use functions and represent Compound data using Lists, Tuples and Dictionaries **CO 4.** Use object oriented concept for python programming. **CO 5.**Use various applications using python.

List of Experiments : [24 Hrs]

1) Write a program that asks the user for a weight in kilograms and converts it to pounds.Thereare 2.2 pounds in a kilogram.
2) Write a program that asks the user to enter three numbers (use three separate inputstatements). Create variables called total and average that hold the sum and average of thethree numbers and print out the values of total and average.
3) Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89.
4) Write a program that asks the user for their name and how many times to print it. Theprogram should print out the user's name the specified number of times.
5) Use a for loop to print a triangle like the one below. Allow the user to specify how highthe triangle should be.
6) Generate a random number between 1 and 10. Ask the user to guess the number and printa message based on whether they get it right or not.
7) Write a program that asks the user for two numbers and prints Close if the numbers arewithin .001 of each other and Not close otherwise.
8) Write a program that asks the user to enter a word and prints out whether that wordcontains any vowels.
9) Write a program that asks the user to enter two strings of the same length. The programshould then check to see if the strings are of the same length. If they are not, the programshould print an appropriate message and exit. If they are of the same length, the programshould alternate the characters of the two strings. For example, if the user enters abcde andABCDE the program should print out AaBbCcDdEe.
10) Write a program that asks the user for a large integer and inserts commas into it accordingto the standard American convention for commas in large numbers. For instance, if theuser enters 1000000, the output should be 1,000,000.
11) In algebraic expressions, the symbol for multiplication is often left out, as in 3x+4y or3(x+5). Computers prefer those expressions to include the multiplication symbol, like3*x+4*y or 3*(x+5). Write a program that asks the user for an algebraic expression andthen inserts multiplication symbols where appropriate.

12) Write a program that generates a list of 20 random numbers between 1 and 100.
(a) Print the list.
(b) Print the average of the elements in the list.
(c) Print the largest and smallest values in the list.
(d) Print the second largest and second smallest entries in the list
(e) Print how many even numbers are in the list.
13) Write a program that asks the user for an integer and creates a list that consists of thefactors of that integer.
14) Write a program that generates 100 random integers that are either 0 or 1. Then find thelongest run of zeros, the largest number of zeros in a row. For instance, the longest run ofzeros in [1,0,1,1,0,0,0,0,1,0,0] is 4.
15) Write a program that removes any repeated items from a list so that each item appears atmost once. For instance, the list [1,1,2,3,4,3,0,0] would become [1,2,3,4,0].
16) Write a program that asks the user to enter a length in feet. The program should then givethe user the option to convert from feet into inches, yards, miles, millimeters, centimeters,meters, or kilometers. Say if the user enters a 1, then the program converts to inches, ifthey enter a 2, then the program converts to yards, etc. While this can be done with ifstatements,it is much shorter with lists and it is also easier to add new conversions if youuse lists.
17) Write a function called sum_digits that is given an integer num and returns the sum of thedigits of num.
18) Write a function called first_diff that is given two strings and returns the first location inwhich the strings differ. If the strings are identical, it should return -1.
19) Write a function called number_of_factors that takes an integer and returns how manyfactors the number has.
20) Write a function called is_sorted that is given a list and returns True if the list is sorted andFalse otherwise.
21) Write a function called root that is given a number x and an integer n and returns x 1/n . Inthe function definition, set the default value of n to 2.
22) Write a function called primes that is given a number n and returns a list of the first nprimes. Let the default value of n be 100.
23) Write a function called merge that takes two already sorted lists of possibly differentlengths, and merges them into a single sorted list.
(a) Do this using the sort method. (b) Do this without using the sort method.
24) Write a program that asks the user for a word and finds all the smaller words that can bemade from the letters of that word. The number of occurrences of a letter in a smaller wordcan't exceed the number of occurrences of the letter in the user's word.
25) Write a program that reads a file consisting of email addresses, each on its own line. Yourprogram should print out a string consisting of those email addresses separated bysemicolons.
26) Write a program that reads a list of temperatures from a file called temps.txt, convertsthose temperatures to Fahrenheit, and writes the results to a file called ftemps.txt.
27) Write a class called Product. The class should have fields called name, amount, and price,holding the product's name, the number of items of that product in stock, and the regularprice of the product. There should be a method get_price that receives the number of itemsto be bought and returns a the cost of buying that many items, where the regular price ischarged for orders of less than 10 items, a 10% discount is applied for orders of between10 and 99 items, and a 20% discount is applied for orders of 100 or more items. Thereshould also be a method called make_purchase that receives the number of items to be bought and decreases amount by that much.
28) Write a class called Time whose only field is a time in seconds. It should have a methodcalled convert_to_minutes that returns a string of minutes and seconds formatted as in thefollowing example: if seconds is 230, the method should return '5:50'. It should also have amethod called convert_to_hours that returns a string of hours, minutes, and secondsformatted analogously to the previous method.

29) Write a class called Converter. The user will pass a length and a unit when declaring anobject from the class—for example, c = Converter(9,'inches'). The possible units areinches, feet, yards, miles, kilometers, meters, centimeters, and millimeters. For each ofthese units there should be a method that returns the length converted into those units. Forexample, using the Converter object created above, the user could call c.feet() and shouldget 0.75 as the result.
30) Write a Python class to implement pow(x, n).
31) Write a Python class to reverse a string word by word.
32) Write a program that opens a file dialog that allows you to select a text file. The programthen displays the contents of the file in a textbox.
33) Write a program to demonstrate Try/except/else.
34) Write a program to demonstrate try/finally and with/as.

Text Books:

S. No.	Title	Authors	Publisher
1)	Let Us Python	Yashavant Kanetkar	bpb
2)	The Complete Reference- Python	Martin C. Brown	Mc Graw Hill Education

Reference Books:

S. No.	Title	Authors	Publisher
1)	Programming and Problem solving with Python	Ashok Namdev Kamthane	Mc Graw Hill Education
2)	Python for Beginners	Rav Teja Yarlagadda	Red'shine Publication

SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI
(An Autonomous Institute affiliated to CSVTU,Bhilai)
Scheme of Examination and Syllabus 2021
Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

Subject Code IT106393	DATA STRUCTURES AND ALGORITHM ANALYSIS Lab	L = 0	T = 0	P = 2	Credits =1
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	-----

Course Objectives	Course Outcomes
1. To implement linear and non-linear data structures 2. Introduce basic operations on linear and non-Linear data structures 3. To understand the different operations of search trees 4. To implement graph traversal algorithms 5. To get familiarized to sorting and searching algorithms	After successful completion if this course, the students will be able to- **CO1**. Identify the appropriate data structure for a given problem. **CO2**. Design various data structure algorithms and estimate their time and space complexity. **CO3**. Apply appropriate algorithm for better utilization of memory. **CO4**. Apply practical knowledge on the applications of data structures. **CO5**. Solve real world problems using sorting and searching techniques.

List of Experiments: [24 Hrs]

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.

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Second Year B. Tech. (IT)
B.Tech (3rd Semester – Information Technology)

Subject Code IT106393	**DATA STRUCTURES AND ALGORITHM ANALYSIS Lab**	**L = 0**	**T = 0**	**P = 2**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	25		**25**	**50**	**-------**

Text Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	Fundamentals of Data Structures	Horowitz and Sahani	Galgotia Publication
2)	Data Structures Using C and C++	Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein	PHI Publications
3)	An Introduction to Data Structures with applications	Jean Paul Trembley and Paul G. Sorenson	McGraw Hill Publications

Reference Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	Data Structures and Program Design in C	R. Kruse etal	Pearson Education
2)	Data Structures	Lipschutz, Schaum's Outline Series	TMH

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Subject Code IT106394	Mini Project - I	**L = 0**	**T =0**	**P =2**	**Credits =1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	25		**25**	**50**	--------

Course Objectives	**Course Outcomes**
To understand the working of Web Applications and clients ide technologies. 1. To provide understanding of how XML can be developed and used. 2. To understand e-commerce. 3. To learn how to host and deploy the web applications on servers. 4. To learn how to Django Processes 5. To provide understanding Wildcard URL patterns	After successful completion if this course, the students will be able to- **CO 1.** Explain the understanding of working of web Applications.. **CO 2.** Explain Architectural Framework for e-commerce. **CO 3.** Develop Web applications that can be hosted on web-servers. **CO 4.** Explain Architectural Framework for Django Processes. **CO5.** Develop Web applications that can be Wildcard URL patterns

Suggested List of Experiments (but should not be limited to): [24 Hrs]

Client Side Scripting: JavaScript, AJAX:-

1. Introduction to Java Script
2. Java Script Simple Arithmetic
3. Pop-up Box usage
4. Introduction to DOM
5. Inbuilt objects and functions: Date, String, Math, Navigator, window etc.
6. Validations: Name, Pin, E-mail, Mobile No.,
7. Validations using Regular Expressions
8. Introduction to AJAX
9. AJAX for text and xml response.
10. Web and social integration i.e. Facebook widgets, Google widgets, Maps, Picasa Photo albums, You tube video albums, Twitter widgets, etc.

Server side Programming: PHP, J2EE, .Net or any web framework

1. Introduction and working of server side program execution
2. Data types and Processing
3. Different Tags and Usage
4. Html Form request handling i.e. get and post
5. Login panel working
6. Data base connectivity
7. Session tracking and cookies
8. Dynamic content and page generation
9. Deployment of web application
10. Testing and solution for i.e. SQL Injection, code injection etc.

Subject Code IT106394	Mini Project - I	**L = 0**	**T =0**	**P =2**	**Credits =1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	25		**25**	**50**	**----------**

Text Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	Ajax Bible	By Steve Holzner, 2007	Wiley
2)	Head First Servlets and JSP 2nd Edition	by Bryan Basham, Kathy Sierra	O'Reilly Media, Inc.

Reference Books:

S. No.	**Title**	**Authors**	**Publisher**
1)	Bert Bates	O'Reilly	Media Publishers
2)	JavaScript Interactive Course	Techmedia	Techmedia
3)	Head First PHP & MySQL	Lynn Beighley	Michael Morrison

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Subject Code (IT100395)	Health, Hygiene and Yoga	L	T	P	Credits = 0
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	25	25	--

Course Objectives	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. 6. 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.

Subject Code (IT100395)	Health, Hygiene and Yoga	L	T	P	Credits = 0
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	25	25	--

UNIT – III: CO 3

(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: CO 4

(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: CO 5

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

Subject Code (IT100396)	CYBER LAWS & ETHICS	L	T	P	Credits = 0
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	25	25	--

Course Objectives	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.

Subject Code (IT100396)	CYBER LAWS & ETHICS	L	T	P	Credits = 0
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	25	25	--

UNIT – IV: Electronic Business and legal issues: CO 4
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: CO 5
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)