

SHRI GURU RAM RAI UNIVESITY

(Estd. By Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 3 of 2017)

PATEL NAGAR, DEHRADUN-248001, UTTARAKHAND, INDIA



SYLLABUS of

Bachelor of Science (IT)

**Effective from Academic Session
2018-2019**

PROGRAMME STRUCTURE

Bachelor of Science in Information Technology

FIRST SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-101	Fundamentals of Computer and Information technology	4	1	-	10	20	30	70	100	5
2.	BS-102	Programming in 'C'	4	-	-	10	20	30	70	100	4
3.	BS-103	Basic Mathematics	4	1	-	10	20	30	70	100	5
4.	BS-AEC1	Environmental Studies	2	-	-	10	20	30	70	100	2
Practical											
1.	BS-P11	Computer Fundamental Lab	-	-	4	30	-	30	70	100	2
2.	BS-P12	Programming in 'C' Lab	-	-	4	30	-	30	70	100	2
Total			14	2	8	100	80	180	420	600	20

SECOND SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-201	Digital Electronics	4	1	-	10	20	30	70	100	5
2.	BS-202	Object Oriented Programming in C++	4	-	-	10	20	30	70	100	4
3.	BS-203	Data Structure Using C	4	1	-	10	20	30	70	100	5
4.	BS-AEC2	English Communication	2	-	-	10	20	30	70	100	2
Practical											
1.	BS-P21	Programming in C++ Lab	-	-	4	30	-	30	70	100	2
2.	BS-P22	Data Structure Lab	-	-	4	30	-	30	70	100	2
Total			14	2	8	100	80	180	420	600	20

TA : Teacher Assessment

CT : Class Test

ESE : End Semester Examination

SUB TOT. : Subject Total

TOT. : Total

THIRD SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-301	Operating System	4	-	-	10	20	30	70	100	4
2.	BS-302	CBNST	4	1	-	10	20	30	70	100	5
3.	BS-303	Computer Networks	4	1	-	10	20	30	70	100	5
4.	BS-SEC1	SEC1	4	-	-	10	20	30	70	100	4
Practical											
1.	BS-P31	Operating System Lab	-	-	4	30	-	30	70	100	2
2.	BS-P32	Networking Lab	-	-	4	30	-	30	70	100	2
Total			16	2	8	100	80	180	420	600	22

FOURTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	C T	TOT	ESE	Sub. Total	
Theory											
1.	BS-401	DBMS	4	1	-	10	20	30	70	100	5
2.	BS-402	Core Java	4	-	-	10	20	30	70	100	4
3.	BS-403	Software Engineering	4	1	-	10	20	30	70	100	5
4.	BS-SEC2	SEC2	4		-	10	20	30	70	100	4
Practical											
1.	BS-P41	DBMS Lab	-	-	4	30	-	30	70	100	2
2.	BS-P42	Java Programming Lab	-	-	4	30	-	30	70	100	2
Total			16	2	8	100	80	180	420	600	22

TA : Teacher Assessment

CT : Class Test

ESE : End Semester Examination

SUB TOT.: Subject Total

TOT. : Total

FIFTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme									Credit
			Period			Sessional			Examination			
			L	T	P	TA	CT	TOT	ESE	Sub Total		
Theory												
1.	BS-DSE1	DSE1	4	-	-	10	20	30	70	100	4	
2.	BS-DSE2	DSE2	3	1	-	10	20	30	70	100	4	
3.	BS-DSE3	DSE3	3	1	-	10	20	30	70	100	4	
4.	BS-SEC3	SEC3	4		-	10	20	30	70	100	4	
Practical												
1.	BS-P51	DSE1 Lab	-	-	4	30	-	30	70	100	2	
2.	BS-P52	SEC3 Lab	-	-	4	30	-	30	70	100	2	
Total			14	2	8	100	80	180	420	600	20	

SIXTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme									Credit
			Period			Sessional			Examination			
			L	T	P	TA	CT	TOT	ESE	Sub Total		
Theory												
1.	BS-DSE4	DSE4	4	1	-	10	20	30	70	100	5	
2.	BS-DSE5	DSE5	4	1	-	10	20	30	70	100	5	
3.	BS-SEC4	SEC4	4	-	-	10	20	30	70	100	4	
Practical												
1.	BS-P61	DSE5 Lab	-	-	4	30	-	30	70	100	2	
2.	BS-P62	Project	-	-	4	30	-	30	70	100	2	
3.	BS-SM	Seminar	-	-	4	100	-	100	-	100	2	
Total			12	2	12	190	60	250	350	600	20	

TA : Teacher Assessment

CT : Class Test

ESE : End Semester Examination

SUB TOT. : Subject Total

TOT. : Total

Skill Enhancement Courses

SEC1 (Choose One)

SEC1.1 System Analysis and Design

SEC1.2 Computer Organization

SEC1.3 Introduction to Logic

SEC3 (Choose One)

SEC3.1 Android Programming

SEC3.2 UNIX and Shell Programming

SEC3.3 PHP Programming

SEC2 (Choose One)

SEC2.1 E-commerce

SEC2.2 Cyber Laws

SEC2.3 Software Testing Concept

SEC4 (Choose One)

SEC4.1 Graph Theory

SEC4.2 System Programming

SEC4.3 MIS

Discipline Specific Elective Papers

DSE 1 (Choose One)

DSE1.1 Web Programming Using HTML and CSS

DSE1.2 Advanced Software Engineering

DSE1.3 Analysis and Design of Algorithms

DSE1.4 Multimedia Systems

DSE 4 (Choose One)

DSE4.1 Design of Compilers

DSE4.2 Mobile Computing

DSE4.3 Advanced Computer Networks

DSE4.4 Client Server Computing

DSE 2 (Choose One)

DSE2.1 Computer Graphics

DSE2.2 Microprocessor Systems

DSE2.3 Artificial Intelligence

DSE2.4 Cloud Computing

DSE 5 (Choose One)

DSE5.1 ASP.NET

DSE5.2 C#. Net

DSE5.3. Advanced Java

DSE 5.4 Python

DSE 3 (Choose One)

DSE3.1 Theory of Computation

DSE3.2 Advanced DBMS

DSE3.3 Cryptography and Network Security

DSE3.4 Data warehousing and Data Mining

FIRST SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-101	Fundamentals of Computer and Information Technology	4	1	4	10	20	30	70	100	5/2

BS-C101 FUNDAMENTALS OF COMPUTER AND INFORMATION TECHNOLOGY

UNIT I Introduction to Computers

Generation of Computer, Hardware Components, Memory Devices, Magnetic Disk, Floppy Disk, Compact Disc/ DVD; Input Devices- Keyboard, Mouse, Scanner, OCR, OMR, MICR. Output Devices- Printer, Types of Printer, Plotter, Monitor: CRT; Central Processing Unit, CPU-Arithmetic Logic Unit, Control Unit, Instruction Set, Registers, Processor Speed, Type Of Processors; Memory- Main Memory Organization, Main Memory Capacity, RAM, ROM, EPROM, PROM, Cache Memory, OCR, OMR, MICR.

Number Systems: Binary, Decimal, Octal, Hexadecimal, Binary Arithmetic, Character Codes (BCD), Excess-3, Gray Code, ASCII

UNIT II –System Software and Application Software

System software, utility packages, compilers, interpreters, Operating Systems, Elementary commands of DOS, Booting.

Application softwares– word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Virus- working, features, types of viruses, virus detection prevention and cure.

UNIT III - Programming Languages and Algorithms

Generation of Languages: Machine language, Assembly languages, High level languages, Language translators (Compiler, Interpreter, Assembler) , Syntax error, Logical error, runtime error, General concepts of OOPS (Object oriented programming), Structured Query Language algorithm development, techniques of problem solving- Flowchart, Pseudo-code, Decision trees, Programming paradigms: Top-down, bottom-up etc.

UNIT IV – Computer Network & Communication Technologies

Communication system elements, communication modes (simplex, half duplex and full duplex analog and digital, synchronous and Asynchronous, Communication media: wired and wireless, LAN WAN, MAN, network topologies,

TEXT BOOKS:

1. Raja Raman V: Fundamentals of Computers
2. Sanders D.H: Computers Today

S.No	Course No.	Subject	Evaluation – Scheme									Theory/ Practical Credit
			Period			Sessional			Examination			
			L	T	P	TA	CT	TOT	ESE	Sub. Total		
Theory												
2.	BS-102	Programming in 'C'	4	-	4	10	20	30	70	100	4/2	

BS-C102 PROGRAMMING IN 'C'

History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programmes. Debugging Techniques,

Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement. Loops: for, while, do-while

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

File: File Handling in C

TEXT BOOKS:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Norton's, "DOS Guide", Prentice Hall of India
5. Gottfried, "Programming in C, Schaum's Series Tata McGraw Hill

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			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	BS-103	Basic Mathematics	4	1	-	10	20	30	70	100	5

BS-103 BASIC MATHEMATICS

Differentiation and Integration: laws of derivative chain rule differentiation using log, repeated derivatives, Integration of algebraic, logarithmic and exponential functions,

Relation , Function & Induction: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation. Types of Function, Composition of function, Recursively defined function, Piano's axioms, Mathematical Induction,

Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Probability and Matrices: Mathematical and statistical probability, axiomatic approach to probability, Law of addition of probability, dependence of events, Baye's Theorem.

Introduction and definition of matrices, types of matrices, matrix addition and scalar multiplication, transpose and inverse of matrix

TEXT BOOKS:

1. Text Book of Engineering Mathematics by N.P. Bali.
2. Higher Engineering Mathematics by B.S. Grewal

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	BS-AEC1	Environmental Studies	2	-	-	10	20	30	70	100	2

BS-AEC1 ENVIRONMENTAL STUDIES

UNIT 1: Introduction to environmental studies and Ecosystems

Definition of environment Multidisciplinary nature of environmental studies;, Scope and importance; Concept of sustainability and sustainable development. What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession.

Unit 2: Natural Resources

Natural resources and their type Land resources and land use change; Land degradation, soil erosion and desertification, Deforestation: Causes and impacts due to mining, dam building on environment Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state)., Energy resources : Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT 3: Environmental Pollution and Environmental Laws

Environmental pollution: types, causes, effects and controls; Nuclear hazards and human health risks, Solid waste management: Control measures of urban and industrial waste, Pollution case studies. Climate change, global warming, greenhouse effect ozone layer depletion, acid rain and impacts on human communities and agriculture

Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD)

UNIT 4: Biodiversity and Conservation&Human Communities and the Environment

Definition of biodiversity Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons; Disaster management: floods, earthquake, cyclones and landslides, Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan., Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Case studies (e.g., CNG vehicles in Delhi).

Field work, Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc., Visit to a local polluted site-Urban/Rural/Industrial/Agricultural., Study of common plants, insects, birds and basic principles of identification., Study of simple ecosystems-pond, river, Delhi Ridge, etc.

TEXT BOOKS:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.

SECOND SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	C T	TO T	ESE	Sub. Total	
Theory											
1.	BS-201	Digital Electronics	4	1	-	10	20	30	70	100	5

BS-201 DIGITAL ELECTRONICS

UNIT 1

Number Systems: Binary, Decimal, Octal, Hexadecimal, Conversion from One Number System to another, Character Codes (BCD), Excess-3, Gray Code, ASCII, 1's Complement Representation, 2's Complement Representation

Logic Gates: AND, OR, NOT, XOR, XNOR, NAND and NOR as Universal Gates

Logic Families: Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOSFET Logic, TTL Gates

UNIT 2

Boolean Algebra: Boolean postulates and laws, De Morgan's Theorem, Principle of Duality, Boolean expression, Boolean function, Minimization of Boolean expressions, Sum of Products (SOP), Product of Sums (POS), Minterm-Maxterm, Canonical forms, Karnaugh map Simplification-Don't care conditions.

UNIT 3

Combinational Circuits: Half Adder, Full Adder, Half Subtractor, Full Subtractor, Serial Adder/Subtractor, Parallel Adder/ Subtractor, BCD Adder/Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer

UNIT 4

Sequential Circuits: Latch, Flip Flops- SR, JK, Data, Toggle, Counters- Synchronous and Asynchronous, Registers- Serial-in-Parallel-out, Parallel-in-Serial-Out, Parallel-in-Parallel-out, Applications of Flip Flops

TEXT BOOKS:

1. M. Morris Mano, Digital Design, 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education(Singapore) Pvt. Ltd., New Delhi, 2003
2. John .M Yarbrough, Digital Logic Applications and Design, Thomson- Vikas publishing house, New Delhi,2002
3. Zaky&Hamacher, "Computer Organization: McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.

S.No	Course No.	Subject	Evaluation – Scheme								Theory/Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	BS-202	Programming in C++	4	-	4	10	20	30	70	100	4/2

BS-202 OBJECT ORIENTED PROGRAMMING USING 'C++'

Introduction: Introduction to OOP, Basic Concepts of OOP, Applications of OOP. Introduction to C++, Introduction to C++ stream I/O, declarations in C++, Creating New data types in C++, function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, default arguments, Unary Scope resolution operator, Linkage specifications.

Class, Constructors, Friend Class : Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --.

Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members in a Derived class, Public, Protocols and Private inheritance, Direct base classes and Indirect Base Classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions: Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors. C++ Stream I/O: Streams, Stream Input, Stream Output, Unformatted I/O, Stream manipulators, Stream format states, Stream error, States.

Files : File Operations –File pointers – error Handling during file Operations

TEXT BOOKS:

1. Deitel H.M. & Deitel P.J. – "How to Program C++" – PHI – 2003
2. Al stevenes – "C++ Programming" – Wiley dreamtech – 2003.
3. Herbert Scheldt, "Complete Reference".
4. E. Balagurusamy "Object Oriented Programming with C++".
5. Yashwant Kanetkar, "Let Us C++".

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	BS-203	Data Structures Using C	4	1	4	10	20	30	70	100	5/2

BS-203 DATA STRUCTURES USING C

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices.

Linked Lists: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes.

Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue, Dequeue, and Priority Queue.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary tree, Huffman algorithm. Binary Search (BST), Insertion and Deletion in BST.

Sorting ,Searching and Hashing: Selection sort, Insertion Sort, Bubble sorting, Quick Sort, Merge Sort Sequential and Binary searching, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies.

TEXT BOOKS:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse etal, "Data Structures and Program Design in C" Person Education
3. A.M. Tenenbaumetal, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure", TMH
5. K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors

S. No.	Course No.	Subject	Evaluation – Scheme							Credit	
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE		Sub. Total
Theory											
4.	BS-AEC2	English Communication	2	-	-	10	20	30	70	100	2

BS-AEC2 ENGLISH COMMUNICATION

UNIT 1 Elementary English

Grammar: Parts of Speech, Tenses, Short responses, Active and Passive Voice

Vocabulary: Idioms and Phrases, Antonyms, Synonyms, One word substitution

Writing skills: Formal and Informal Letters

UNIT 2 Employability skills

Communication: Types, Objectives, Formal and Informal Communication, Barriers to communication, Selection of appropriate communication medium, Verbal and Non-verbal Communication

Soft Skills: Public Speaking, Presentation Skills, Speech, Debates, Role play, Emotion Management

UNIT 3 Career Skills

Interviews, CV Preparation, Group discussion, Personality Development

TEXT BOOKS:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Business Communication: Rajender Paul

THIRD SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-301	Operating System	4	-	4	10	20	30	70	100	4/2

BS-301 OPERATING SYSTEM

UNIT 1

Introduction: Operating System- Definition, Types of OS- Simple batch system, Time sharing systems, Real time systems, Multiprocessor systems, Distributed systems, System components - OS Services, System Calls.

UNIT 2

Process concepts: PCB, Process Scheduling , Operations on Processes , Co-operating process , IPC , Threads- Overview, Benefits, User & Kernel Threads.

CPU Scheduling:, Scheduling criteria , Preemptive & Non-preemptive scheduling, Scheduling algorithms

UNIT 3

Process Synchronization: Background, Critical Section problem, Critical Regions, Synchronization hardware, Semaphores, Classic Problems of Synchronization

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention , Deadlock Avoidance , Deadlock Detection and Recovery from Deadlock.

UNIT 4

Memory Management: Logical vs. Physical address space, Swapping, Contiguous memory allocation, Non-Contiguous memory allocation- Paging, Segmentation, Segmentation with paging.

Virtual Memory: Background, Demand paging - Performance, Page replacement, Page replacement algorithms (FCFS, LRU), Allocation of frames, Thrashing.

UNIT 5

File Systems: File concept, access methods, Allocation methods-contiguous, linked and index allocation, Directory System – single level, tree structured, acyclic graph and general graph directory, File protection.

Disk Management: Secondary storage structure: Disk structures, Disk Scheduling, Disk reliability.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne , "Operating System Concepts", Sixth Edition, John Wiley & Sons, Inc.
2. MilankovicM "Operating System concepts and Design", 2nd edition, Tata Mcgraw hill.
3. Deitel H.M. "An Introduction to Operating Systems" ,2nd edition, Pearson Education.

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TO T	ESE	Sub. Total	
Theory											
2.	BS-302	CBNST	4	1	-	10	20	30	70	100	5

BS-302 COMPUTER BASED NUMERICAL TECHNIQUES

UNIT 1

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method,

UNIT 2

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct Method and pivoting, ILL conditioned system of equations, Refinement of solution. Gauss Seidal iterative method.

UNIT 3

Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: newton's forward and backward formula Central Difference Formulae: Gauss forward and backward Formula, stirling's, Bassel's, Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula.

UNIT 4

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's Rule Euler-Maclaurin Formula Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods.

TEXT BOOKS:

1. Rajaraman V., :Computer Oriented Numerical Methods". PHI
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
3. Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New AgerInt.
4. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.
5. T.Veerarajan, T Ramchandran, "Theory and Problems of Numerical Methods", TMH

S.No	Course No.	Subject	Evaluation – Scheme									Theory/ Practical Credit
			Period			Sessional			Examination			
			L	T	P	TA	CT	TOT	ESE	Sub. Total		
Theory												
3.	BS-303	Computer Networks	4	1	4	10	20	30	70	100	5/2	

BS-303 COMPUTER NETWORKS

UNIT 1

Overview of Networking: Introduction; Need of Networking; Elements of Network; Modes of communication, topology, categories of network (LAN, MAN, WAN); Reference models: OSI reference model, TCP/IP reference model, ISDN.

Physical Layer: Overview of analog & digital signals, transmission media (guided & unguided); TDM, FDM, WDM; Circuit switching: time division & space division switch, Telephone network.

UNIT 2

Data link layer: Framing (character and bit stuffing), Types of errors, error detection & correction methods; Flow control: Protocols: Stop & wait ARQ, Sliding Window Protocols HDLC; Medium access sub layer: Channel Allocation, LAN Protocols, FDM, TDM, CSMA/CD/CA, ALOHA protocols, Overview of IEEE standards, IEEE 802.3 Ethernet, IEEE 802.11, IEEE 802.15.1

UNIT 3

Network layer: Internetworking devices, Routing: techniques, static vs. dynamic routing; Routing algorithms: flooding, distance vector routing, link state routing; Protocols: ARP, RARP, ICMP; IP Addressing: classful address, subnetting; IPv4 and datagram, IPv6; Congestion control algorithms

UNIT 4

Transport layer: Design issues, Connection management, TCP window Management, Port No., Socket Address, User Datagram Protocol, Transmission Control Protocol.

UNIT 5

Application layer: DNS; E-mail, SMTP, FTP, POP, SNMP, TFTP, HTTP; Introduction to Network Security: Symmetric and Asymmetric Cryptography

TEXT BOOKS:

1. B. A. Forouzan – "Data Communications and Networking (3rd Ed.)" – TMH
2. A. S. Tanenbaum – "Computer Networks (4th Ed.)" – Pearson Education/PHI
3. W. Stallings – "Data and Computer Communications (5th Ed.)" – PHI/ Pearson Education

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	BS-SEC1	SEC1	4	-	-	10	20	30	70	100	4

SEC1.1 SYSTEM ANALYSIS AND DESIGN

UNIT 1

System Concepts and Information System Environment: The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed and closed system, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

UNIT 2

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation and Maintenance. The Role of the Systems Analyst: Historical Perspective, Academic and Personal Qualifications, the multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

UNIT 3

Systems Planning and Initial Investigation: Strategies for Determining Information Requirement, Problem Definition and Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis.

UNIT 4

Information Gathering: Kind of Information needed. Information about the firms, Information gathering tools, the art of Interviewing, Types of Interviews and Questionnaires. The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees. Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

UNIT 5

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements form Design.

TEXT BOOKS:

1. Elias M.Awad, "Systems Analysis and Design" Galgotia Publication
2. Hoffer, "Modern Systems Analysis and Design" Addison Wesley
3. Kendall, "Introduction to System Analysis and Design", McGraw Hill

SEC1.2 COMPUTER ORGANIZATION

UNIT 1

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle), Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers.

UNIT 2

Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

UNIT 3

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

TEXT BOOKS:

1. Computer System Architecture, PHI/Pearson Education, 3rd Edition, M. Morris Mano
2. Digital Computer Fundamentals , Tata McGraw Hill, 6th Edition, Thomas C. Bartee

SEC1.3 INTRODUCTION TO LOGIC

UNIT 1

Introduction: logic, truth tables, equivalence, language to logic, applications to circuit design, exponential growth, Semantic Tableaux, problem solving with semantic Tableaux.

UNIT 2

Propositional logic: Syntax of propositional logic, rules of natural deduction, the sequent calculus, resolution in propositional logic: Normal forms, Resolving arguments, Resolution, Combinatorial search problems.

UNIT 3

Resolution in Predicate Logic: Predicate Logic, quantifiers, Normal Forms, Herbrand Universes, Resolution, Unification, Problem solving using resolution

TEXT BOOKS:

1. The Essence of Logic. John Kelly. Prentice-Hall International
2. Virginia Klenk, Understanding Symbolic Logic, 5/e, Pearson Education

FOURTH SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-401	DBMS	4	1	4	10	20	30	70	100	5/2

BS-301 DATA BASE MANAGEMENT SYSTEM

UNIT 1

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation,

UNIT 2

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, constraints, relational algebra, relational calculus, tuple and domain calculus.

UNIT 3

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins

UNIT 4

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, Multivalued Dependencies, 4NF, 5NF.

TEXT BOOKS:

1. Date C.J. "An Introduction to Database System". Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

S.No	Course No.	Subject	Evaluation – Scheme								Theory/P ractical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	BS-402	Core Java	4	-	4	10	20	30	70	100	4/2

BS-402 CORE JAVA

UNIT 1

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming,

UNIT 2

I/O Java applet. Java Library: String handling, I/O exploring JAVA, Networking, Applet Classes, Event Handling

UNIT 3

Introduction to AWT, Working with windows, Graphics, AWT Controls, Layout manager and menu, Images, Additional Packages.

UNIT 4

Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet. Image Menu: An image based menu.

TEXT BOOKS:

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH
2. Balagurusamy E, "Programming in JAVA, TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley
4. Mark Wutica, "Java Enterprise Edition" QUE
5. Steven Hoizner, "Java2 Black book" Dreamtech

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	BS-403	Software Engineering	4	1	-	10	20	30	70	100	5

BS-403 SOFTWARE ENGINEERING

UNIT1

Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT 2

Software Requirement Specifications (SRS) : Requirement Engineering Process- Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

UNIT 3

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT 4

Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of products. Static Testing Strategies: Formal Technical, Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT 5

Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities. An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

TEXT BOOKS:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed.Boston: McGraw Hill, 2001
2. Jalote, Pankaj, "Software Engineering Ed.2"New Delhi: Narosa 2002
3. Schaum's Series, "Software Engineering" TMH
4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI

S.No	Course No.	Subject	Evaluation – Scheme									Credit
			Period			Sessional			Examination			
			L	T	P	TA	CT	TOT	ESE	Sub. Total		
Theory												
4.	BS-SEC2	SEC2	4	-	-	10	20	30	70	100	4	

SEC2.1 E- Commerce

UNIT 1

Introduction: Electronic Commerce, Technology and Prospects, Definition of E-Commerce, Economic potential of electronic commerce, Incentives for engaging in electronic commerce, forces behind E-commerce, Advantages and Disadvantages, Architectural framework, Impact of E-commerce on business.

UNIT 2

Mobile Commerce: Introduction, Wireless Application Protocol (WAP), Mobile Computing devices and applications.

UNIT 3

Web security and Encryption: Security issues on the Web, Importance of Firewall, Limitation of Firewall, Encryption Techniques, Symmetric and Asymmetric Encryption, Digital Signature, Virtual Private Network.

UNIT 4

Electronic Payments: Overview, The SET protocol, Payment Gateway, certificates, Digital tokens, Smart card, credit card, magnetic strip card, E-checks, Credit/Debit Card based EPS, Online Banking.

EDI Applications in business, E-commerce Laws, Forms of agreement, Govt. policies

TEXT BOOKS:

1. Ravi Kalakota, Andre Winston, "Frontiers of E-commerce", Addison Wesley
2. Bajaj and Nag, "E-commerce: The cutting edge of business", TMH
3. P. Loshin, John Vacca, "Electronic Commerce", Firewall Media, New Delhi

SEC2.2 CYBER LAWS

Definitions, Digital Signature And Electronic Signature, Penalty and Compensation for damage to computer systems, Tampering with Computer Source Documents.

Punishment for sending offensive messages through communication service etc., Punishments for dishonestly receiving stolen computer resource or communication device, Punishment for identity theft. Punishment for cheating by personation by using computer resource, Punishment for violation of privacy, Punishment for cyber terrorism. Punishment for publishing or transmitting obscene material in electronic form, Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form, Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form, Breach of confidentiality and privacy.

TEXT BOOKS:

1. M. Merkow, J. Breithaupt, Information Security Principles and Practices, Pearson Education. 2005
2. G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning, 2010

SEC2.3 SOFTWARE TESTING

Introduction to Testing

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

Functional Testing, Black-box Testing, Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

Structural Testing, White-box Testing, Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

TEXT BOOKS:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, McGraw Hill Education.2009.
2. Yogesh Singh, Software Testing, Cambridge University Press,2011.

FIFTH SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-DSE1	DSE1	4	-	4	10	20	30	70	100	4/2

DSE1.1 WEB PROGRAMMING USING HTML AND CSS

UNIT 1

Introduction- Introduction to the Internet, Introduction to HTML Terminology, Designing a Webpage: Design Considerations and Planning, Basic Tags and Document Structure, HTML Tags, Head Tags, Title Tags, Body Tags, Metadata, Saving an HTML Page

UNIT 2

Page Formatting- Adding a New Paragraph, Adding a Line Break, Inserting Blank Space, Preformatted Text, Changing a Page's Background Color, Div Element. Text Items and Objects: Headings, Comments, Block Quotes, Horizontal Lines. Special Characters, Creating Lists- Numbered (Ordered) Lists, Bulleted (Unordered) Lists, Nested Lists, Definition Lists.

UNIT 3

Links-What are Links?, Text Links, Image Links, Opening a Page in a New Window or Tab, Setting all Links on a Page to Open in a New Window or Tab, Linking to an Area on the Same Page (Bookmarks), Linking to an E-mail Address, Linking to Other Types of Files, Images- Introduction to Images for Webpages, Adding Images to Webpages, Resizing an Image, Alternative (ALT) Text, Image Labels.

UNIT 4

Basic Tables-Inserting a Table, Table Borders, Table Headers, Col and row span, IFrames: What is an Iframe, Inserting Iframes, Setting Height and Width, Using an Iframe for a link target. Forms: About Forms, Text Boxes, Text Areas, Check Boxes, Menu Lists, Radio Buttons, The Submit Button, The Reset Button, Changing the Tab Order, Sending to E-mail, event handling

UNIT 5

Cascading Style Sheets- CSS Introduction , CSS Syntax, Creating an External CSS, Linking to a CSS, Adding Comments and Notes to a CSS, Creating an Internal Style Sheet, ID and Class, Inline Styling. Working With Text in CSS: Emphasizing Text (Bold and Italic), Decoration, Indentation, Transformation, Text Alignment, Fonts, Font Sizes, Letter Spacing, Text Color, Margins, Padding, Borders, Styling Links, Number and Bullet Styles, Sizing Elements, Text Wrapping, Shadowing.

TEXTBOOKS

1. Burdman, "Collaborative Web Development", Addison Wesley
2. Sharma & Sharma, "Developing E-Commerce Sites" Addison Wesley
3. Iva Bayross, "Web Technologies Part-II" BPB Publications

DSE1.2 ADVANCED SOFTWARE ENGINEERING

UNIT 1

Unified Modeling Language, Basic structures and modeling classes, common modeling techniques, relationships, common mechanism, class diagrams.

UNIT 2

Advanced structured modeling, advanced classes and relationships, interfaces, types and roles, instances and object diagram. Basic idea of behavioral modeling.

UNIT 3

Object-oriented concepts and principles. Identifying the elements of an object model. Object oriented projects metrics and estimation. Design for object – oriented systems.

The system design process. Object-oriented testing – testing OOA and OOD models. The object – oriented testing strategies. Inter class testing.

UNIT 4

Technical metrics for O-O systems. Class oriented metrics and metrics for O-O projects. Advanced topics in software engineering. Component based software engineering and development. Classifying and retrieving components.

DSE1.3 ANALYSIS AND DESIGN OF ALGORITHMS

UNIT 1

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences. Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort Medians and order statistics.

UNIT 2

Advanced Data Structure: Red-Black Trees, Augmenting Data Structure. B Trees, Binomial Heaps, Fibonacci Heaps, Data Structure for Disjoint Sets.

UNIT 3

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

UNIT 4

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem.

UNIT 5

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness, Approximation Algorithms.

TEXT BOOKS:

1. Cormen, Rivest, Lisserson, : "Algorithm", PHI.
3. A V Ahoetal, "The Design and analysis of Algorithms", Pearson Education

DSE1.4 MULTIMEDIA SYSTEMS**UNIT 1**

Introduction to Multimedia, Applications of Multimedia, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software, Authoring Tools, MIDI

UNIT 2

Multimedia Building Blocks- Text, Image, Sound, Video, Animation

UNIT 3

Sound, Analog and Digital Audio, Sampling, Audio File Formats, Conversion from Analog to Digital Audio

UNIT 4

Bitmap and Vector Images Image standards and classifications, Image File Formats , Image Compression for JPEG, GIF, and PNG, Lossy and Lossless Compression for Images and Audio, Animation Concepts and Techniques, Computer Animation, Video capture and representation, and Database.Content based retrieval for text and images, Video Video representation, Colors, Video Compression, MPEG standards, MHEG Standard, Video File Formats

UNIT 5

Recent developments in Multimedia, Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Content Based Retrieval

TEXT BOOKS:

1. Buford "Multimedia Systems" Addison Wesley.
2. Agrawal & Tiwari "Multimedia Systems" Excel.

S.No	Course No.	Subject	Evaluation – Scheme								Credit
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			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	BS-DSE2	DSE2	3	1	-	10	20	30	70	100	4

DSE2.1 COMPUTER GRAPHICS

UNIT 1

Graphics Primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal display Plotters, Printers. Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera. Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors.

UNIT 2

Line Drawing Algorithms: DDA Algorithms, Bresenham's Line algorithm. Segment & Display files: Segments, Functions for segmenting the display file, Posting and posting a segment, segment naming schemes, Default error conditions, Free storage allocation, Display file structure.

UNIT 3

Transformation: 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformation between coordinate systems. 3D Graphics: 3D Display Methods, 3D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal

Graphics Operations: Clipping, Point Clipping, Line Clipping, Polygon Clipping. Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

UNIT 4

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid, Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications. Bezier curves and surfaces

TEXT BOOKS:

1. Donald Hearn and M Pauline Baker, "Computer Graphics" PHI
2. Steven Harrington, "Computer Graphics: A Programming Approach" TMH
3. Prajapati A.K. "Computer Graphics" PPM Ed2

DES2.2 MICROPROCESSORS**UNIT 1**

introduction to Microprocessor, History of Microprocessors, Micro-Computers and Micro-Controllers, Microprocessor architecture and its operations, Memory, Input & output devices, Logic devices for interfacing, The 8085 MPU, Example of an 8085 based computer, Memory interfacing & Address Decoding.

UNIT 2

Basic interfacing concepts, Interfacing output displays, Interfacing input devices, Memory mapped I/O, Peripheral Mapped I/O, Flow chart symbols, Data Transfer operations, Arithmetic operations, Logic Operations, Branch operation, Writing assembly language programs, Programming techniques: looping, counting.

UNIT 3

Additional data transfer and 16 bit arithmetic instruction, Arithmetic operations related to memory, Logic operation: rotate, compare, Stack, Subroutine, Restart, Conditional call and return instructions, 8085 Interrupts, 8085 vector interrupts, RIM & SIM Instruction.

UNIT 4

Program: Addition, subtraction, multiplication & division of 8-bit numbers, finding largest & smallest numbers in an array, sorting of array, BCD-to-Binary conversion, Binary-to-BCD conversion.

UNIT 5

8255 Programmable peripheral interface, interfacing keyboard and seven segment display, Direct Memory Access and 8237 DMA controller.

TEXT BOOKS:

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", 5th Edition, Penram International Publication (India) Pvt. Ltd.
2. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill.

DSE2.3 ARTIFICIAL INTELLIGENCE

UNIT 1

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area problem Solving in games, natural language, automated reasoning, visual perception, heuristic algorithm versus solution guaranteed algorithms.

UNIT 2

Understanding Natural Languages. Parsing techniques, Context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammars, Shanks Conceptual Dependency, grammar free analyzers, sentence generation, and translation.

UNIT 3

Knowledge Representation, First order predicate calculus, Horn Clauses, Introduction to PROLOG, Semantic Nets, Partitioned Nets, Minsky frames, Case Grammar Theory, Production Rules Knowledge Base, the Interface System, Forward & Backward Deduction.

UNIT 4

Expert System Existing Systems (DENDRAL, MYCIN), Inference Engine, domain exploration Meta Knowledge, Expertise Transfer, Self Explaining System.

UNIT 5

Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception Semantic & Model, Object Identification, Speech Recognition.

Programming Language; Introduction to programming Language, LISP, PROLOG.

TEXT BOOKS:

1. Winston, "LISP", Addison Wesley.
2. Marcellous, "Expert System Programming", PHI.
3. Elamie, "Artificial Intelligence", Academic Press.

DSE2.4 CLOUD COMPUTING

UNIT 1

CLOUD COMPUTING FUNDAMENTALS: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT 2

CLOUD APPLICATIONS: Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

UNIT 3

MANAGEMENT OF CLOUD SERVICES: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat)

UNIT 4

APPLICATION DEVELOPMENT: Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

TEXT BOOKS:

1. GautamShroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press; 1 edition.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media; 1 edition
3. Dimitris N. Chorafas, "Cloud Computing Strategies" CRC Press; 1 edition

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TO	ESE	Sub. Total	
Theory											
3.	BS-DSE3	DSE3	3	1	-	10	20	30	70	100	4

DSE3.1 THEORY OF COMPUTATION

UNIT 1

Introduction of Finite Automata- Alphabets, Strings, Languages, Finite Automata (FA), acceptance of strings and languages, Deterministic Finite Automata (DFA) and Non Deterministic Finite Automata (NFA), transition diagrams and Language recognizers. Conversions and Equivalence: Equivalence between NFA with and without ϵ -transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output-Moore and Mealy machines.

UNIT 2

Regular Expressions & Languages- FA and Regular Expressions, Conversion from RE to FA and FA to RE, Pumping lemma for regular languages, Closure properties of regular languages, Equivalence and minimization of Automata.

UNIT 3

Context Free Grammars and Languages-CFG, Leftmost, Rightmost derivations, Ambiguity in grammars and languages. Simplification of Context Free Grammars, Chomsky normal form (CNF), Greibach normal form (GNF), Pumping Lemma for Context Free Languages.

UNIT 4

Push Down Automata-Definition and languages of PDA, Equivalence & conversion of CFG's and PDA's, Deterministic PDA.

UNIT 5

Turing Theory-Turing Machines, definition, model, design of TM, Variations of TM-Multitape TMs, Non Deterministic TM, Universal TM, The Church-Turing thesis Recursively enumerable languages, Context -Sensitive Languages and the Chomsky Hierarchy. Unsolvable Problems-Halting Problem, Post's Correspondence Problem (PCP).

TEXT BOOKS:

1. Hopcroft JE. and Ullman JD., "Introduction to Automata Theory, Languages & Computation", Narosa.
2. K.L.P Mishra & N. Chandrasekharan – "Theory of Computer Science", PHI
3. Ash & Ash – "Discrete Mathematics", TMH
4. Martin—Introduction

DSE3.2 ADVANCED DBMS

UNIT 1

Transaction Processing Concepts: Transaction system, testing of serializability, Serializability of Schedules Conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, Checkpoints, deadlock handling

UNIT 2

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version Schemes, Recovery with concurrent transaction.

UNIT 3

Distributed DBMS Concepts and design: Introduction, functions and architecture of a DDBMS, transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database, Introduction to OODBMS.

TEXT BOOKS:

1. Adv. DBMS by V.K. Jain, Cyber Tech Publication, 5A/13 Ansari Road, Daryaganj, N.Delhi.-110002
2. Date C.J. "An Introduction to Database System". Addison Wesley
3. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
4. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley

DSE3.3 CRYPTOGRAPHY AND NETWORK SECURITY

UNIT 1

Introduction To security: Attacks, Services & Mechanisms, Security, Attacks, Security Services, Conventional Encryption: Classical Techniques, Conventional Encryption Model, and steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

UNIT 2

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RC5, Placement & Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

UNIT 3

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DDS)

UNIT 4

Network & System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP),S/Mime Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security: Principles and Practice" Prentice hall, New Jersey
2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. AtulKahate, "Cryptography and Network Security" TMH

DSE3.4 DATAWAREHOUSING AND DATAMINING

UNIT 1

DSS - Uses, definition, Operational Database. Introduction to DATA Warehousing. Data-Mart, Concept of Data-Warehousing, Multi-Dimensional Database Structures. Client/Server Computing Model & Data Warehousing.

Parallel Processors & Cluster Systems. Distributed DBMS implementations.

UNIT 2

DATA Warehousing. Data Warehousing Components. Building a Data Warehouse. Warehouse Database.

Mapping the Data Warehouse to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data

Extraction, Cleanup & Transformation Tools. Metadata.

UNIT 3

Business Analysis. Reporting & Query Tools & Applications. On line Analytical Processing (OLAP). Patterns & Models. Statistics. Artificial Intelligence.

UNIT 4

Knowledge Discovery, Data Mining. Introduction to Data-Mining. Techniques of Data-Mining. Decision Trees.

Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Introduction. Selecting & Using the Right Technique.

TEXT BOOKS:

1. Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics", Pearson Education
2. Pieter Adriaans, Dolf Zantinge, "Data-Mining", Pearson Education

S.No	Course No.	Subject	Evaluation – Scheme								Theory/ Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
4.	BS-SEC3	SEC3	4	-	4	10	20	30	70	100	4/2

SEC3.1 ANDROID PROGRAMMING

UNIT 1

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

UNIT 2

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT 3

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

UNIT4

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes. User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, Dialog.

TEXT BOOKS:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

SEC3.2 UNIX AND SHELL PROGRAMMING

UNIT 1

Basic Unix Commands: The Unix editors and vi; Redirection, Piping, Tees and filters; The Unix Utilities grep, sed, etc. Overview of Unix Architecture: The kernel and the Shell; Processes and Time Sharing files and Directories; Peripheral Device as files.

UNIT 2

Introduction the Shell Scripts: The Bourne and C-shells; Shell variables, scripts meta-characters and environment; the if and case statements; for, while and until loops. Discussion of the Unix system calls and 'C' library functions.

UNIT 3

Bourne Shell: Shell meta characteristics, shell variable, scripts, facilities, commands and environments, shell archive, idea about restricted shell, ROLC program.

UNIT 4

KornShell: Shell variables and scripts, built in EDITOR, built in integer arithmetic, string manipulation capabilities, Command Aliasing, Array Job control.

C-Shell: Shell variables and scripts, shell facilities, history Integer Arithmetic Decision making and job control.

TEXT BOOKS:

1. Stephan Prata, Advanced Unix – A Programmers Guide – BPB PUB.
2. Kernighan & Pike, The Unix Programming Environment – PHI.
3. The Unix System Manuals.

SEC3.3 PHP PROGRAMMING

UNIT 1

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in

PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator. PHP operator Precedence and associativity.

UNIT 2

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission.

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit

UNIT 3

PHP Functions: Function, Need of Function , declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local

UNIT 4

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array: Anatomy of an Array ,Creating index based and Associative array ,Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function

TEXT BOOKS

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.
3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

SIXTH SEMESTER

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-DSE4	DSE4	4	1	-	10	20	30	70	100	5

DSE4.1 DESIGN OF COMPILERS

UNIT 1

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. Programming Language: High level languages, lexical and syntactic structure of a language, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission. Lexical Analysis: The role of Lexical Analyzer, A Simple approach to the design of Lexical Analyzer, Regular Expressions, Transition Diagrams, Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer.

UNIT 2

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG. Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive descent Parsers, Predictive Parser, Bottom-up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC

UNIT 3

Intermediate Code Generation: Different Intermediate forms: Three address code, Quadruples & Triples, Syntax Directed Translation mechanism and attributed definition.

Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation. Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management.

Error Detection and Recovery: Lexical phase errors. Syntactic phase errors, semantic errors.

UNIT 4

Code Optimization and Code Generation: Local optimization, Peephole optimization, Basic blocks and flow Graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.

TEXT BOOKS:

1. Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa
2. A.V. Aho, R. Sethi and J.D.Ullman, "Compiler Principle, Tech & tools" AW
3. H.C. Holub "Compiler Design in C", Printice Hall Inc.
4. Apple, "Modern Computer Implementation in C: Basic Design" Cambridge Press

DSE4.2 MOBILE COMPUTING

UNIT 1

Introduction to Mobile Computing, Issues in Mobile Computing, Wireless Telephony, Digital Cellular Standards, cellular system architecture, Multiple Access Protocols : TDMA, FDMA and CDMA, GSM, GPRS, handoffs, Near-far problem, channel allocation in cellular systems.

UNIT 2

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, TCP over wireless- Indirect TCP, Snoop Protocol, Fast retransmit and Mobile TCP, Mobile IP, WAP: Architecture, applications.

UNIT 3

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system (CODA), Disconnected operations.

UNIT 4

Mobile Agents computing, transaction processing in mobile computing environment, location management- static and dynamic, Ping pong effect, location based services.

UNIT 5

What is Ad-hoc Network? , Problems with Message Routing in Wireless Ad-hoc Mobile Networks, Dynamic State Routing (DSR), Route Maintenance and Routing error, Fisheye Routing (FSR), Ad-hoc on Demand Distance Vector (AODV)

TEXT BOOKS:

1. ShambhuUpadhyaya, AbhijeetChaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers
2. UWE Hansmann, LotharMerk, Martin-S-Nickious, Thomas Stohe, "Principles of Mobile Computing", Springer International Edition

DSE4.3 ADVANCED COMPUTER NETWORKS

UNIT 1

Introduction: Overview of computer network, seven-layer architecture, TCP/IP suite of protocol.

UNIT 2

Mac protocols for high-speed LANS, MANs & WIRELESS LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.) Fast access technologies. (For example, ADSL, Cable Modem, etc.)

UNIT 3

IPv6: why IPv6, basic protocol, IPv6 main header extension headers, support for QoS, security, etc, ESP, Authentication header

UNIT4

Network security: Symmetric and asymmetric cryptography, Secure-HTTP, SSL,, Key distribution protocols. Digital signatures, digital certificates.

TEXT BOOKS

1. W. R. Stevens, "TCP/IP illustrated, Volume 1: The protocols", Addison Wesley 1994.
2. G. R. Wright. "TCP/IP illustrated, Volume 2: The implementation", Addison Wesley 1995

DSE4.4 CLIENT SERVER COMPUTING

UNIT 1

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

UNIT 2

Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, DynamicData Exchange (DDE), Object Linking and Embedding (OLE), Common Object RequestBrokerArchitecture (CORBA).,The server: Detailed server functionality, the network operating system,available platforms, the network operating system, available platform, the server operating system.

UNIT 3

Client/Server Network: connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

UNIT 4

Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards. Network protection devices, Power Protection Devices, UPS, Surge protectors.

UNIT 5

Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training.

The future of client server Computing Enabling Technologies, The transformational system.

TEXT BOOKS:

1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI

S.No	Course No.	Subject	Evaluation – Scheme								Theory/Practical Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
2.	BS-DSE5	DSE5	4	1	4	10	20	30	70	100	5/2

DSE5.1 ASP.NET

Introduction to .NET framework : Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.

Language Concepts and the CLR: Visual Studio .NET - Using the .NET Framework.

The Framework Class Library: NET objects - ASP .NET - .NET web services – Windows Forms

ASP.NET Features: Change the Home Directory in IIS - Add a Virtual Directory in IIS- Set a Default Document for IIS - Change Log File Properties for IIS - Stop, Start, or Pause a Web Site.

Creating Web Controls: Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding web controls to a Page.

Creating Web Forms: Server Controls - Types of Server Controls - Adding ASP.NET Code to a Page.

DSE5.2 C#.NET

UNIT 1

Introduction to .NET Framework- .NET framework, MSIL, CLR, CLS, CTS, Just in time (JIT) Compiler, Base class library, Namespaces, Assemblies, DLL Hell -Problem, Garbage Collection.

UNIT 2

C# Object oriented programming- OOPs, Classes and objects, loops, Array, Encapsulation, Inheritance, Polymorphism, Interface, Constructor and Destructors, Method Overloading, Method overriding, Operator Overloading, Modifiers, Indexers, Collections Namespaces, Delegates, Exception Handling.

UNIT 3

Microsoft .NET IDE- Creating a Project and solution, Building project, Debugging project, Solution Explorer, Toolbox, Server Explorer, Property Window, Windows Forms and Controls in details-The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls.

UNIT 4

ADO.Net, C# windows forms for data control: Grid, Datasource and databinding controls, Connected and disconnected scenarios, Dataset, connections, Adapters, commands, data readers.

UNIT 5

ASP.net-Introduction to ASP.NET, Architecture, Working with Web and HTML Controls, Web forms, Using Rich Server Controls, Overview of ASP.NET Validation Controls, Data base connectivity using ASP.net.

TEXT BOOKS:

1. A Guide to the Project Management Body of Knowledge (PMBOK), Project Management Institute, PA.
2. Addison Wesley –C# Developers Guide to ASP.Net
3. Wiley, "Beginning Visual C# 2008", Wrox

DSE5.3 ADVANCED JAVA

UNIT 1

Core Java: Introduction Operator, Data Types, Variable, Arrays, Control statements, Methods & classes, Inheritance , Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling,

UNIT 2

Introduction to AWT, AWT controls, Layout manager, Menus, Images, Graphics. Java Swing: Creating a swing applet and application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner Frame.

UNIT 3

JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database. Java Beans: Application Builder tools, The bean developer kit (BDK). JAR files, Introspection, Developing a simple bean, using Bound properties. The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB).

UNIT 4

Introduction to RMI (Remote Method Invocation): A simple client server application using RMI. Java Servlets: Servlet API basic, Life cycle of a servlet, Running Servlet, Debugging Servlets. Thread-safe servlets HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

TEXT BOOKS:

1. MargareLevingYoung."The complete Reference Internet" TMH
2. Naughton, Schidt, "The Complete Reference JAVA2", TMH
3. Balagurusamy E, "Programming in JAVA, TMH

DSE5.4 PYTHON

UNIT 1

Introduction, History, Features, Setting up path, Working with Python, Basic Syntax, Variable and Data Types Operator, Conditional Statements If, If- else, Nested if-else. Looping- For, While, Nested loops, Control Statements, Break, Continue, Pass

UNIT 2

String Manipulation, Accessing Strings, Basic Operations, String slices, Function and Methods, Lists, Introduction, Accessing list, Operations, Working with lists, Function and Methods

UNIT 3

Tuple: Introduction, Accessing tuples, Operations, Working, Functions and Methods

Dictionaries: Introduction, Accessing values in dictionaries, Working with dictionaries, Properties, Functions

Functions: Defining a function, Calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables

UNIT 4

Modules, Importing module, Math module, Random module, Packages, Composition, Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
3.	BS-SEC4	SEC4	4	-	-	10	20	30	70	100	4

SEC4.1 GRAPH THEORY

UNIT 1

Definition, examples and basic properties of graphs, pseudo graphs, complete graphs, bi-partite graphs, isomorphism of graphs, paths and circuits

UNIT 2

Eulerian circuits, Hamiltonian cycles, the adjacency matrix, weighted graph, travelling salesman's problem.

UNIT 3

Shortest path Algorithms: prims, Kruskal , Dijkstra's , Floyd-Warshall algorithm.

UNIT 4

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph.

TEXT BOOKS:

1. Edgar G. Goodaire and Michael M. Parmenter, *Discrete Mathematics with Graph Theory*, 2nd Ed., Pearson Education (Singapore) P. Ltd., Indian Reprint 2003.
2. Rudolf Lidl and Günter Pilz, *Applied Abstract Algebra*, 2nd Ed., Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

SEC4.2 SYSTEM PROGRAMMING

UNIT 1

Introduction to system software: definition, feature of system programming, system programming vs. application programming and type of system programs.

Assembler: single pass assembler, two-pass assembler, and general design procedure of an assembler.

UNIT 2

Macro processor: macro language and its features, macro instructions, features of macro facility, implementation, one pass macro processor, two pass macro processor, Implementation.

Loaders and linkers: simple linker vs. loaders, and design and implementation of direct linking loader, subroutine linkage & other loader schemes

UNIT 3

Compilers: overview of compilation process, lexical analysis, syntax analysis, semantic analysis and intermediate code generation and code optimization techniques, compiler vs. interpreter.

Introduction

to device driver, functions and structure of text editor.

TEXT BOOKS:

1. Aho and Ulman, "Principles of Compilers", Narosa Publishing House, 1986.
2. J. Donovan, "System Programming", TMH Publishing House Pvt. Ltd.
3. D M Dhamdhare, "System Programming", TMH Publishing House Pvt. Ltd.

SEC4.3 MANAGEMENT INFORMATION SYSTEMS

UNIT 1

Organisation & Types, Decision Making, Data & information, Characteristics & Classification of information, Cost & value of information, various channels of information & MIS.

UNIT 2

Foundation of Information System: Introduction to Information System in Business Fundamentals of Information System, Solving Business Problems with Information System, Concept of Balanced MIS, Effectiveness & Efficiency Criteria. Tool and Techniques of MIS- dataflow diagram, flow chart etc.

UNIT 3

Business application of information technology: electronic commerce Internet, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information system for managerial Decision Support, Information System for Strategic Advantage.

UNIT 4

Managing Information Technology, Enterprise & Global Management, Security & Ethical Challenges, Planning & Implementing Change. Reports: Various types of MIS reports, GUI & Other Presentation tools.

UNIT 5

Advanced concepts in information system: Enterprise Resource Planning: introduction, various modules like Human Resources, Finance, Accounting, and Production & Logistics. Supply Chain Management, CRM, Procurement, and Management System Object Oriented modeling case studies.

TEXT BOOKS:

1. Brein James O. – Management Information Systems
2. Murdick & Ross – Information Systems for Modern Management
3. Parker C.S. – Management Information Systems – Strategy and Action.
4. Aktas A. Ziya – Structured Analysis and Design of Information Systems.