

SBSA1101	DIGITAL COMPUTER FUNDAMENTALS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To Understand the concept of digital systems
- To operate on various number systems and Simplify Boolean functions.
- To Distinguish logical and combinational circuits
- To Design counters and understand the working of arithmetic logic and control unit

UNIT 1**9 Hrs.**

Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.

UNIT 2**9 Hrs.**

Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method.

UNIT 3**9 Hrs.**

Sequential logic - RS, JK,D and T Flip flops - Registers -Shift Registers - Counters - Ripple Counters - Synchronous Counter - Design of Counters.

UNIT 4**9 Hrs.**

Adders - Subtractors - Decoders - Encoders - Multiplexer - Demultiplexer - Design of Circuits using decoders/Multiplexers - ROM - PLA - Designing circuits using ROMIPLA.

UNIT 5**9 Hrs.**

Design of ALU - Design of Status Register - Design of accumulator - Introduction to Computer Design.

Max. 45 Hours**COURSE OUTCOMES :**

- CO1 - To Understand the concept of digital systems
 CO2 - To operate on various number systems and Simplify Boolean functions.
 CO3 - To Distinguish logical and combinational circuits
 CO4 - To Design counters and understand the working of counters
 CO5 - To Design arithmetic logic and control unit
 CO6-To evaluate the combinational circuits

Text /Reference Books:

1. M. Morris Mano, "Computer System Architecture", Pearson Education, 2008.
2. Carter Nicholas, "Computer Architecture", Schaun outline Seives , Tata McGraw-Hill, 2008.
3. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
4. 1. Leach.D.P&Malvino.A.P, (2002), "Digital Principles and Applications", FifthEdition, TMH.(UNIT I,II,III)
5. 2. MorisMano.M,(2001),"Digital Logic and Computer Design", Forth Edition,
6. AnanthiShashasaayee, Sheshasaayee.J.G,(2003), "Digital Logic Fundamentals",First Edition ,Margham Publications

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration : 3 Hrs.****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**20 Marks****PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SBSA1102	PROGRAMMING IN C & C++	L 3	T *	P 0	Credits 4	Total Marks 100
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COURSE OBJECTIVES

- To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ program.
- To demonstrate a thorough understanding of modular programming by designing programs which require the use of programmer-defined functions.
- To impart the knowledge about pointers which is the backbone of effective memory handling.
- To perform Inheritance, Overloading of operators, functions, constructors and File Handling
- To demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.

UNIT 1**12 Hrs.**

BASICS OF C PROGRAMMING: Introduction to C: Features of C - Structure of C program-Data Types-'C' Tokens-Input/output statements-Control Statement, Functions: – Types of Functions –Recursion.

UNIT 2**12 Hrs.**

ARRAYS, STRINGS AND STRUCTURES: **Arrays:** Single and Multidimensional Arrays— Array as Function Arguments, **Strings:** String Handling Functions, Structure: Nested Structures – Array of Structures – Structure as Function Argument–Function that Returns Structure, Union.

UNIT 3**12 Hrs.**

POINTERS AND FILE PROCESSING: **Pointers:** Introduction, Arrays Using Pointers – Structures Using Pointers – Functions Using Pointer, **Dynamic Memory Allocation, Storage Classes, File Handling in 'C'**

UNIT 4**12 Hrs.**

OBJECT ORIENTED PROGRAMMING CONCEPTS: Introduction-Procedure vs. object oriented programming-Concepts: **Classes and Objects-Operator and Function Overloading-Inheritance-Polymorphism and Virtual Functions.**

UNIT 5**12 Hrs.**

TEMPLATES AND EXCEPTION HANDLING: **Function Templates and Class Templates – Name spaces – Standard Template Library - Casting – Exception Handling – case study.**

Max. 60 Hours**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Develop simple applications in C using basic constructs.
- CO2 - Design and Implement applications using arrays and strings.
- CO3 - Develop and Implement applications using memory allocation and File concepts.
- CO4 - Use proper class protection to provide security.
- CO5 - Describe the reusability of code through Inheritance.
- CO6 - Demonstrate the use of virtual functions to implement polymorphism.

TEXT/ REFERENCE BOOKS

1. Deitel and Deitel, C how to Program, 7th Edition, Pearson Education, 2013.
2. Brian W.Kernighan and Dennis M.Ritchie, The C Programming Language, Pearson Education, 2015.
3. Yashavant Kanetkar, Understanding Pointers in C, 4th Revised & Updated Edition, Bbp Publications, 2008.
4. E Balagurusamy, Object Oriented Programming with C++, 3rd edition, Tata McGraw Hill, 2006.
5. Bhavne, Object Oriented Programming with C++, Pearson Education, 2004.
6. John R Hubbard, "Programming with C++", Schaums Outline Series, McGraw Hill, 2nd edition, 2009.
7. Bjarne Stroustrup, Programming: Principles and Practice using C++, 1st Edition, Addison Wesley Publications, 2008

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration : 3 Hrs.****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**20 Marks****PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SBSA1201	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	Credits	Total Marks
		3	*	0	4	100

COURSE OBJECTIVES :

- It focuses on how to organize VCDsQe data for more efficient problem solving using data structures methods and techniques.
- To impart the basic concepts of data structures and algorithms
- To be familiar with writing recursive methods.
- To understand concepts about searching and sorting techniques.
- To implement basic concepts about stacks.
- To apply the concepts of queues and its types.

Unit I**12 Hrs.**

Arrays- Linked List - Single Linked List - Insertion and Deletion - Doubly Linked List - Circular Linked List – Stack- Queues- Array implementation of a Stack and queue - Linked List implementation of a Stack and Queue- Priority Queues

Unit II**12 Hrs.**

Evaluation of arithmetic expression using stack- Prefix –Infix-Postfix-notations, Converting infix expressions to postfix- Evaluation of postfix expression,-Towers of Hanoi problem.

Unit III**12 Hrs**

Tree Structures: Binary Trees- Implementation of Binary Trees- Linear Representation of Binary Tree-Linked representation of a Binary Tree. **Binary Tree Traversal** : Pre order – In order - Post order.

Unit IV**12 Hrs**

Sorting Techniques: Bubble Sort- Merge Sort - Shell Sort- Insertion Sort- Selection Sort-Quick Sort- Heap Sort. **Searching Techniques:** Sequential Search- Binary Search-**Hashing- Indexing.**

Unit V**12 Hrs**

Graphs and Networks: Implementation of Graphs - Adjacency Matrix- Depth First Search-Breadth First Search. **Networks:** Minimum Spanning Tree - The Shortest path Algorithm.

Max 60 Hrs**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Understand the concept of recursive algorithms.
- CO2 - Demonstrate the different types of data structures.
- CO3 - Able to understand the operations on linear data structures.
- CO4 - Summarize searching and sorting techniques.
- CO5 - Choose appropriate data structure as applied to specified problem definition.
- CO6 - Understand and implement the applications of linear data structures.

TEXT / REFERENCE BOOKS:

1. E. Horowitz, S. Sahni, Fundamentals of Data Structures.
2. Bhagat Singh and Thomas L, Introduction to Data Structures, Naps, TMH.
3. Helieman, Data Structures, Algorithms and Object Oriented Programming.
4. Thomas H Coreman, Charles E Leiseron, Ronald L Rivest, Introduction to Algorithms, PHI 2002.
5. Jean-Paul Tremblay, Paul G. Sorenson, 'An Introduction to Data Structures with Application', TMH, 2017.
6. Richard F, Gilberg, Forouzan, "Data Structures", Cengage, 2004, 2nd Edition.
7. Larry R. Nyhoff, ADTs, Data Structures, and Problem Solving with C++, Prentice Hall Editin, 2004.
8. Thomas H. Cormen, Charles E. Leiserson, "Introduction to Algorithms", 3rd Edition, 2010.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1202	PYTHON PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES :

- To provide Basic knowledge of Python
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs
- To learn syntax of Python language
- To create dynamic applications in Python
- To implement object oriented concepts using Python

Unit I 9 Hrs

Overview of Programming : Structure of a Python Program, Elements of Python.

Unit II 9 Hrs

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

Unit III 9 Hrs)

Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

Unit IV 9 Hrs

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables.

Unit V 9 Hrs

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists.

Max 45hrs

COURSE OUTCOMES:

- CO1 - To provide Basic knowledge of Python
 CO2 - To learn how to design and program Python applications.
 CO3 - To learn how to use lists, tuples, and dictionaries in Python programs
 CO4 - To learn syntax of Python language
 CO5 - To create dynamic applications in Python
 CO6 - To implement object oriented concepts using Python

TEXT /REFERENCE BOOKS:

1. Allen Downey, Jeffrey Elkner, Chris Meyers.How to think like a computer scientist learning with Python / 1st Edition,2012
2. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705

USEFUL WEBSITES:

1. <http://docs.python.org/3/tutorial/index.html>
2. <http://interactivepython.org/courselib/static/pythonds>
3. <http://www.ibiblio.org/g2swap/byteofpython/read/>

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration : 3 Hrs.

20 Marks

80 Marks

SBSA1301	OPERATING SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES :

- To learn how computers work and to learn about system design (performance vs. simplicity, HW vs. SW, etc.)
- To have an overview of different types of operating systems.
- To learn and implement the concept of process management.
- To observe the concept of storage management.
- To understand the concept of I/O and file systems.
- To learn the basics of Linux Programming

UNIT I 9 Hrs

Introduction: Operating system –Views and Goals - Types of System- OS Structure - Components - Services - System Structure - Layered Approach - Process Management: Process - **Process Scheduling - Cooperating Process - Threads - Inter-process Communication.**

UNIT II 9 Hrs

CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms. **Process Synchronization:** Critical-Section Problem - Synchronization Hardware - Semaphores Classical Problems of Synchronization - Critical Region - Monitors.

UNIT III 9 Hrs

Deadlocks: Characterization- Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT IV 9 Hrs

Memory Management: Address Binding - **Dynamic Loading and Linking - Overlays - Logical and Physical Address Space - Contiguous Allocation- Non-Contiguous Allocation.**

UNIT V 9 Hrs

File System: File Concepts - Access Methods - Directory Structures - Protection Consistency Semantics - File System Structures - Allocation Methods - Free Space Management.

Max : 45hrs

COURSE OUTCOMES:

- CO1 - Understand the fundamental components of a computer operating system and how computing resources are managed by the operating system.
- CO2 - Apply the concepts of CPU scheduling, synchronization and deadlocks in real computing problems.
- CO3 - Demonstrate the different memory and I/O management techniques used in Operating Systems.
- CO4 - Have practical exposure to the concepts of semaphores and monitors for process synchronization.
- CO5 - Create design and construct the following OS components: Schedulers, Memory management systems in the modern operating system.
- CO6 - Understand file system structure and implement a file system such as FAT.

TEXT /REFERENCE BOOK:

1. A. Silberschatz P.B.Galvin, Gange., Operating System Concepts, 6th Edition., Addison-Wesley Publishing Co., 2002.
2. H.M. Deitel, An Introduction to Operating System, Second Edition, Addison Wesley, 1990.
3. A.S. Godbole, Operating System-Tata McGraw Hill-1999.
4. William Stallings, Operating Systems, Fourth Edition, PHI.
5. Andrew S Tanenbaum, Operating Systems: Design and Implementation, Third Edition,

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration : 3 Hrs.

20 Marks

80 Marks

SBSA1302	JAVA PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- To understand and apply the fundamentals core java, packages, database connectivity for computing
- To provide knowledge on advanced features like Swing, JavaBeans, Sockets
- To understand the principles and concepts of object oriented programming
- To Store and retrieve the information from Files.
- To learn multithreading concepts

UNIT I**(9 Hrs)**

An Overview of Java - Features of Java - Object oriented concepts - Lexical Issues - Data Types - Variables - Type Conversions and Casting - Arrays - Operators - Control Statements.

UNIT II**(9 Hrs)**

Introduction to Classes and Objects - Declaring Objects and Methods - Constructors - this keyword - finalize() method - Overloading Methods - Overloading Constructors - Recursion - Access Control - Static and Final methods and variables - Nested and Inner class - String class - String Handling

UNIT III**(9 Hrs)**

Inheritance - Using super - Overriding Methods - Abstract classes - Final with Inheritance – Multi Threaded programming

UNIT IV**(9 Hrs)**

Packages - Access Protection – Importing Packages – Interfaces – Exception Handling – throw and throws. – Sting tokenizer – Date – Calendar- Random.

UNIT V**(9 Hrs)**

Applet - AWT Controls - Layout Managers and Menus- -Swing - JDBC/ODBC Connection

Max 45hrs**COURSE OUTCOME :**

- CO1 - To understand the principles and concepts of object oriented programming
 CO2 - To Store and retrieve the information from Files.
 CO3 - To learn multithreading concepts
 CO4 - Implement the interface, package and multithread concepts
 CO5 - Implement various built in package and its applications
 CO6 - Develop web based applications using applet programming

TEXT /REFERENCE BOOKS:

1. Herbert Schildt, The Complete Reference JAVA2, 7th Edition, McGraw-Hill/Osborne Media.
2. Bruce Eckel, Thinking in Java, 4th edition, Prentice Hall
3. Michael Morrison, Java Unleashed, 3rd edition, SAMS Publishing
4. Clayton Walnum, Java By Example, QUE Publications, 2000.
5. K. Arnold and J. Gosling, The JAVA programming language, Third edition, Pearson Education, 2000

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1302	COMPUTER ARCHITECTURE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To design and analyze the main functional units of computer and to understand the combinational and sequential circuits.
- Implementing assembly programs that accomplish basic computational and I/O operations.
- To impart knowledge on various types of Registers and Microinstructions.
- To discuss about the Data path design and Processor design in detail.
- To understand the types of memory organizations.
- To discuss about the registers, interface and communication in I/O devices.
- To analyze about the characteristics, structure communication and synchronization of multiprocessors.

UNIT I (9 Hrs)

Number systems - Conversion from one number system to another - Compliments - Binary codes - Binary logic - Binary Arithmetic - Logic gates - Truth tables. Boolean Algebra - Axioms - Truth table simplification of Boolean function - Map method - Mc-Clausky tabulation method.

UNIT II (9 Hrs)

Combinational Logic: Adders - Subtractors - Decoders - Encoders - Multiplexer – Demultiplexer Sequential logic: RS, JK, D and T Flip flops - Registers -Shift Registers Counters - Design of Counters.

UNIT III (9 Hrs)

Associative Memory – Cache Memory – Virtual Memory – Auxiliary Memory Memory Management Hardware. Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer: Handshaking – Serial Transfer – Communication Interface – Modes of Transfer – Priority Interrupt – DMA –Serial Communication-

UNIT IV (9 Hrs)

Introduction to micro computers, Microprocessors and Assembly languages - Microprocessor architecture and its operations - 8085 MPU - 8085 instruction set and Classifications.

UNIT V (9 Hrs)

Central Processing unit: General register and stack organizations, instruction formats - Addressing modes, Data transfer and manipulation - program control, RISC – Pipelining – Arithmetic and instruction, RISC pipeline – vector processing and array processors.

Max 45hrs**COURSE OUTCOMES**

- CO1 - Classify the various types of registers, microinstructions and addressing modes.
 CO2 - Design the data path for processor
 CO3 - Demonstrate the usage of Memory Organization.
 CO4 - Describe about the I/O devices.
 CO5 - Explain the characteristics, structure, communication and synchronization of multiprocessor.
 CO6 - State the inter processor communication and synchronization.

TEXT /REFERENCE BOOKS:

1. M.Moris Mano, Computer system Architecture. PHI (Third edition, 1993)
2. M.M. Mano, Digital Logic and Computer Design, Prentice Hall of India, 1994.
3. Carl Hamacher, Uonko G.Vranesic, Safwat G.Zaky – Computer Organisation, McGraw hill ISE 1987.
4. John, P.Hayes., Computer System architecture, McGraw Hill, ISE,1988.
5. Hwang.K.Briggs .F.A -Computer Architecture and parallel Processing, McGraw Hill ISE, 1988.
6. T.C.Bartee, Computer Architecture and logical Design, McGraw Hill, 1991.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1304	SOFTWARE ENGINEERING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES :

- Knowledge of basic SW engineering methods and practices, and their appropriate application.
- A general understanding of software process models, role of project management, different software architectural styles and approaches to verification and validation
- Software process models and compare their applicability
- Identify the key activities in managing a software project
- Concepts of requirements engineering and Analysis Modelling
- Apply systematic procedure for software design and deployment

UNIT I (9 Hrs)

Definition of software and software engineering – Software myths –Software Engineering paradigms: Linear Sequential Model and Prototyping Model-Incremental – Spiral Model- Iterative Model. Software Project Management. Software Cost Estimation – Software Project Planning.

UNIT II (9 Hrs)

Introduction – The software requirement specifications – Formal specification techniques – Languages and processors for requirements specification : SDAT, SSA, GIST, PSL/PSA, REL/REVS- Software prototyping – rapid prototyping techniques- user interface prototyping- Analysis and modeling – data, functional and behavioral models – Structured analysis and data dictionary.

UNIT III (9 Hrs)

Abstraction – Modularity – Software architecture – Cohesion, coupling – Various design concepts and notations – Real time and distributed system – Design – Documentation – Data flow oriented design – **Jackson system development** – Design for reuse – Programming standards. User interface Design- principles- **SCM**- Need for SCM- Version control – Introduction to SCM process – software configuration items

UNIT IV (9 Hrs)

Levels - Test activities - Types of s/w test - Black box testing - Testing boundary condition - Structural testing- Test coverage criteria based on data flow mechanisms - Regression testing - Testing in the large- S/W testing strategies - Strategic approach and issues - Unit testing - Integration testing - Validation testing - System testing and debugging. Case studies – Writing black box and white box testing

UNIT V (9 Hrs)

Introduction – **Quality assurance** – Walk through and inspections – Static analysis – Symbolic execution- **Software Maintenance**: Introduction – Enhancing maintainability during development- Managerial aspects of software maintenance – Configuration management – Source code metrics – Other maintenance tools and techniques

Max 45hrs**COURSE OUTCOMES**

- CO1 - Identify and apply software lifecycle model for a given problem and will know the criteria for each level of CMM.
 CO2 - Comprehend types of requirements and summarize Requirement Engineering Process
 CO3 - Design data, functional and behavioral model for any given software requirement.
 CO4 - Identify and analyze levels of testing and perform white box testing and black box testing for a given problem.
 CO5 - Describe concepts of software quality assurance and software configuration management.
 CO6 - Compare and contrast forward engineering, reverse engineering and reengineering.

TEXT / REFERENCE BOOKS:

1. Pressman. R. S. ,Software Engineering - Fourth Edition- McGraw Hill International Edition 1997.
2. Richard Fairley, Software Engineering - (Design Reliability and Management), -Tata McGraw hill Edition -1983.
3. Fleeger.P Software Engineering, - Prentice Hall, 1999.
4. Pfleeger and Lawrance, "Software Engineering: Theory and Practice" Pearson Education, Second Edition, 2001
5. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning PrivateLimited ,2009.
6. Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
7. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1305	COMPUTER GRAPHICS AND MULTIMEDIA	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES:

- It aims at teaching about geometric information, 2D and 3D graphics, animation and multimedia.
- To introduce Two and Three dimensional graphical structure.
- To design 2D and 3D methods and Models
- To explore the visible surface detection with illumination and color models.
- To understand the concepts involved in multimedia and basis tools.
- To gain knowledge on Multimedia compression and animations.

UNIT I**(9 Hrs)**

Introduction to computer Graphics - Video display devices- Raster scan Systems - Random Scan Systems - Interactive input devices - Hard copy devices - Graphics software - Output primitives - line drawing algorithms - initializing lines - line function - circle Generating algorithms.

Unit II**(9 Hrs)**

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations- Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping-Text Clipping-Exterior Clipping.

Unit III**(9 Hrs)**

Three Dimensional Concepts - 3D Geometric and Modeling Transformations – Three-Dimensional Viewing - Visible-Surface Detection Methods: Back-Face Detection - Depth-Buffer Method -Scan Line Method - A-Buffer Method-Depth Sorting Method- BSP Tree Method-Area Subdivision Method.

Unit IV**(9 Hrs)**

Multimedia – Definition- Introduction-Multimedia Software- Basic Tools- Multimedia Authoring Tools- Multimedia Building Blocks: Text- Font Editing and Design Tools – **Hypermedia and Hypertext – Multimedia System Sounds – MIDI Versus Digital Audio – Making MIDI Audio – Audio File Formats– Adding Sound to Your Multimedia Project.**

Unit V**(9 Hrs)**

Images: Making Still Images – Color – Image File Formats – Animation: The Power of Motion – Principles of Animation – Making Animations that Work – Video: Using Video – How Video works - Broadcast Video Standards – Integrating Computers and Television – Shooting and Editing Video – Video Tips – Recording Formats – Digital Video-Multimedia and the Internet

Max 45hrs**COURSE OUTCOMES :**

- CO1 - Identify the various line & circle drawing algorithm. Study the various transformations in 2D and 3D objects.
 CO2 - Understand the concepts of curves and surface.
 CO3 - Apply transformation and clipping algorithm in 2D and 3D objects.
 CO4 - Design Illumination and color models.
 CO5 - Implement 2D and 3D Transformation concepts in Real world Applications
 CO6 - To explore the visible surface detection with illumination and color models.

TEXT /REFERENCE BOOKS:

1. D. Hearn and M.P. Baker ,Computer Graphics, 2nd Edition ,PHI 1996
2. Tay Vaughan ,Multimedia: Making it Work,7th Edition, Tata McGraw Hill Edition ,2008
3. W.M. Neumann and R.F. Sproull ,Principle of Interactive Computer Graphics , McGraw Hill,2nd edition ,2002
4. Ranjan Parekh, Principles of multimedia – Sixth edition, Tata McGraw Hill – 2008
5. D. P. Mukherjee , “Fundamentals Of Computer Graphics And Multimedia ” Prentice Hall of India Private Limited, 2006.
6. D. McClelland, L.U.Fuller ,”Photoshop CS2 Bible”, Wiley Publishing, 2005.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1401	DATABASE MANAGEMENT SYSTEM	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To gain knowledge in fundamentals of data models using ER diagram.
- To make a study of SQL and relational database design.
- To understand about Query processing, optimization and Concurrency control technique
- To understand terms related to database design and management
- To gain knowledge in relational model and relational database management system
- To implement relational databases using SQL & My SQL

UNIT I**(9 Hrs)**

Basic Concepts: Database and Database users – Database system concepts and architecture – Data modeling using Entity Relationship model – Enhanced entity relationship and object modeling – Record storage and file organizations – Index Structures for files

UNIT II**(9 Hrs)**

Relational Model, Languages and Systems: The Relational Data Model, Relational Constraints, and the relational Algebra – SQL – The Relational Database Standard – ER and EER to Relational Mapping and Other Relational Languages – Examples of Relational Database Management Systems: Oracle and Microsoft Access.

UNIT III**(9 Hrs)**

Database Design, Theory and Methodology: Functional dependencies and normalization for relational database – Relational database design algorithms and further dependencies – Practical database design and tuning

UNIT IV**(9 Hrs)**

System Implementation Techniques: Database system architectures and the system catalog – Query processing and optimization

UNIT V**(9 Hrs)**

Transaction processing concepts – Concurrency control techniques – Database recovery techniques – Database security and Authorization. Introduction to Emerging Database Technologies and Application

Max 45hrs**COURSE OUTCOMES**

- CO1 - Design ER-models to represent simple database application scenarios
- CO2 - Ability to understand and design data modelling using Entity-Relationship model
- CO3 - Implement SQL to a broad range of query and data update problems
- CO4 - Articulate socio-economic applications of distributed databases and use database recovery mechanisms
- CO5 - Familiar with data warehousing and data mining applications
- CO6 - Apply Normalization techniques to normalize and improve the database design

TEXT / REFERENCE BOOKS:

1. Elmasri & Navathe, Fundamentals of Database Systems, 6th Edition, Addison Wesley, 2010
2. Korth, Silberschatz & Sudarshan, Database System Concepts, 5th Edition, Tata McGraw Hill, 2010
3. Raghu Ramakrishnan & Johannesgerhrke, Data Base Management Systems, 3rd Edition, Tata Mc Graw Hill, 2002.
4. Abraham Silberschatz, Henry.F.Korth and S.Sudharshan, "Database System Concepts", 4th Edition, 2002.
5. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", 3rd Edition, Elsevier, 2012
6. Jan L. Harrington, "Object oriented database design", Harcourt India private limited 2000.

USEFUL WEBSITES:

http://nptel.iitm.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design/index.php

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1402	CLOUD COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To articulate the main concepts, key technologies, strengths, and limitations of cloud computing
- To learn how to use Cloud Services.
- To implement Virtualization
- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and Multi-tenancy computing
- To study about various models of cloud environments and virtualization.
- To manage the cloud computing infrastructure with security.
- To gain knowledge of cloud and to understand about Fog, edge computing.

UNIT I**(9 Hrs)**

The vision of cloud computing - The cloud computing reference model - Characteristics and benefits - Challenges ahead - Historical developments - Distributed systems - Virtualization - Building cloud computing environments - Application development - Infrastructure and system development - Computing platforms and technologies. Parallel vs. distributed computing - Elements of parallel computing - Hardware architectures for parallel processing Approaches to parallel programming - Laws of caution.

Unit-II**(9 Hrs)**

Introduction - The cloud reference model - Types of clouds - Economics of the cloud Virtualization: Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Pros and cons of virtualization - Technology example: VMware: full virtualization.

Unit-III**(9 Hrs)**

Anatomy of the Aneka container - Introducing parallelism for single-machine computation - Programming applications with threads - Multithreading with aneka - Programming applications with aneka threads. Cloud computing economics: Cloud infrastructure - Economics of private clouds - Software productivity in the cloud - Economies of scale: public vs. private clouds.

Unit-IV**(9 Hrs)**

Multi-entity support - Multi-schema approach - Multi-tenancy using cloud data stores - Data access control for enterprise applications. Data in the cloud: Relational databases - Cloud file systems: GFS and HDFS - BigTable, HBase - Cloud data stores: Datastore and SimpleDB.

Unit-V**(9 Hrs)**

Amazon web services: Compute services - Storage services - Communication services - Additional services. Google AppEngine: Architecture and core concepts - Application life cycle - Cost model - Observations. Microsoft azure: Azure core concepts - SQL azure - Windows azure platform appliance.

Max 45hrs**COURSE OUTCOMES**

- CO1 - Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
 CO2 - Implement and install the cloud tools to make enable the cloud computing infrastructures.
 CO3 - Apply and design suitable Virtualization concept, Cloud Resource Management and collaboration services.
 CO4 - Create combinatorial auctions for cloud resources and services for computing clouds Develop and make cloud services as commercial.
 CO5 - Assess cloud and cloud to Fog with IoT.
 CO6 - Ability to, understand fog computing architecture

TEXT/REFERENCE BOOKS :

1. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing" - Foundations and Applications Programming, MK publications, 2013.
2. Gautam Shroff, "Enterprise Cloud Computing: Technology, Architecture, Applications" by Cambridge University Press, 2010.
3. Cloud computing concepts, technology and Architecture – Thomas Erl, Zaigham Mahmood, Ricardo Puttini, Pearson, 2017.
4. Instant Guide to Cloud Computing, Anand Nayar(Ed), Ashokkumar, sudeep Tanwar, BPB, 2019.

5. Cloud computing a practical approach - Anthony T.Velte, Toby J. Velte Robert Elsenpeter TATA McGraw - Hill, New Delhi - 2010
6. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA1403	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES :

- To Understand the fundamentals of Object Oriented System Development
- To understand the object oriented methodologies.
- To use UML in requirements elicitation and designing.
- To understand concepts of relationships and aggregations.
- To test the software against its requirements specification

UNIT I (9 hrs.)**INTRODUCTION**

Overview of object oriented language systems development – Object basics hierarchy – Object and identity –Static and dynamic binding – Object oriented SDLC.

UNIT II (9 hrs.)**OBJECT ORIENTED METHODOLOGIES**

Rumbaugh et al.'s technique – Booch, Jacobson Methodologies – Patterns – Framework – Unified approach –UML – UML diagrams – UML dynamic modeling – UML extensibility – UML meta-model.

UNIT III (9 hrs.)**OBJECT-ORIENTED ANALYSIS**

Use case model – Object analysis classification – Approaches for identifying classes – Classes responsibilities and collaborators – Identifying object relationships, attributes and methods.

UNIT IV (9 hrs.)**OBJECT ORIENTED DESIGN**

Design process and design axioms – Designing classes – Access Layer – Object storage and object Interoperability – View layer – Designing interface objects.

UNIT V (9 hrs.)**SOFTWARE QUALITY**

Software quality assurance – Testing strategies – Test cases – Test plan – Myers debugging principle – System usability and measuring user satisfaction.

Max 45hrs**COURSE OUTCOMES**

- CO1 - Understand the basics object model for System development.
- CO2 - Understand the object Oriented Methodologies
- CO3 - Express software design with UML diagrams
- CO4 - Understand the concept of Relationships
- CO5 - Design software applications using OO concepts.
- CO6 -Understand the various testing methodologies for OO software

TEXT/ REFERENCE BOOKS:

1. Ali Bahrami, "Object oriented systems development using the unified modeling language", 1st Edition, McGraw- Hill, 1998.
2. Grady Booch, James Rumbaugh, and Ivar Jacobson, "The Unified Modeling Language User Guide", 3rd Edition Addison Wesley, 2007.
3. John Deacon, "Object Oriented Analysis and Design", 1st Edition, Addison Wesley, 2005.
4. Grady Booch, James Rumbaugh, and Ivar Jacobson, "The Unified Modeling Language User Guide", 3rd Edition Addison Wesley.
5. John Deacon, "Object Oriented Analysis and Design", 1st Edition, Addison Wesley,.
6. Bernd Oestereich, "Developing Software with UML, Object - Oriented Analysis and Design in Practice", Addison-Wesley.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****PART A :** 10 Questions of 2 marks each uniformly distributed – No choice**PART B :** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration : 3 Hrs.****20 Marks****80 Marks**

SBSA2101	PROGRAMMING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF PROGRAMS

1. Program to check whether a number is positive or negative or zero using if statement.
2. Program to check vowel or consonant using switch case statement.
3. Program to check whether a number is prime or not using while statement.
4. Program to generate multiplication table using do...while statement.
5. Program to check the given string is palindrome or not using for statement.
6. Program to display Fibonacci series.
7. Program to search an element in an array using linear search method.
8. Program to find the smallest and largest number among 'n' numbers.
9. Program to sort elements in an array.
10. Program to add two matrices.
11. Program for manipulating the strings using string handling functions.
12. Program to find the sum of 'n' numbers by making function.
13. Program to calculate factorial of a number using recursion.
14. Program to generate the mark sheet of the student using structure.
15. Program to copy the content of one file to other file.
16. Program to read and print student details using structure pointer.

SBSA2201	DATA STRUCTURES LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF EXPERIMENTS

1. Linked List Implementation .
2. Stack Implementation using Array
3. Queue Implementation using Linked List (Make the program for Ex.1 as a header file and use it)
4. Binary Search Tree Traversal
5. Implementation of Dijkstra's Algorithm
6. String Pattern Matching Algorithm
7. Sorting Techniques
 - a. Heap Sort
 - b. Quick sort
8. Searching Techniques
 - a. Linear Search b. Binary Search
9. Greedy Method – Minimum Spanning Tree
10. Backtracking – N Queens Problem
11. Divide & Conquer – Merge Sort

SBSA2301	JAVA PROGRAMMING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF PROGRAMS

1. Substring removal from a String using StringBuffer class.
2. Determining the orders of the numbers generated randomly using Random class
3. Usage of Calendar class and manipulation
4. String manipulation using CharArray
5. Usage of Vector class
6. Implementing Thread based applications and exception handling
7. Application using synchronization such as Thread based, Class based and synchronized Statement Using Applets and swings
8. Working with frames and other controls
9. Working with Dialog and Menus
10. Working with Panel and Layout
11. Incorporating Graphics
12. Database creation for storing email addresses and manipulation using Swing

SBSA2401	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF EXPERIMENTS

1. Data Definition Language(DDL).
2. Data Manipulation Language(DML)
3. Data Control Language(DCL)
4. Constraints and Built-in functions.
5. Joins and Group-by functions.
6. PL/SQL programs using functions
7. PL/SQL programs using procedures
8. PL/SQL programs using triggers
9. Developing GUI applications using PHP.
10. Student Information System.
11. Inventory Management.
12. Payroll Processing.

SBSA1501		L	T	P	Credits	Total Marks
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SBA1101	PRINCIPLES OF MANAGEMENT AND PROFESSIONAL ETHICS	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 MANAGEMENT FUNCTIONS & STRUCTURE

9 Hrs.

Management - Definition -Role of managers- Levels of management-Basic Function - Contribution of Taylor & Fayol. Types of structures - Line, staff, Functional, Committee and Project & Matrix - Structures. Departmentalization - Centralization - Decentralization - Span of control. Management by COURSE OBJECTIVES (MBO)- Management by Exception (MBE).

UNIT 2 MANAGEMENT OF ORGANISATION

9 Hrs.

Forms of Business / Industrial Ownership - Sole Trader, Partnership, Joint stock Company, Performance Appraisal - Basic Principles - Pitfalls - Methods to Overcome. Industrial Safety - Causes of Accidents - Cost of Accidents - Measures to avoid Accidents. Plant Layout & Maintenance - Need, Types & Managerial Aspects.

UNIT 3 ORGANISATIONAL BEHAVIOUR

9 Hrs.

Organisational Behaviour - Definition - Nature & Scope - Contributing Disciplines - Importance of OB to Managers. Personality - Definition - Theories - Factors Influencing Personality. Motivation - Definition - Theories. Transactional Analysis. Morale & Job Satisfaction - **Factors Influencing Job Satisfaction**.

UNIT 4 GROUP DYNAMICS

9 Hrs.

Group - Definition - Types - Determinants of Group Cohesiveness. Communication - Process - Barriers - Effective Communication. Leadership-Definition- leadership styles- Theories of leadership - **Factors Contributing to Effective Leadership**. **Trade Unions**- Role of Trade Union in Organizations - Types and Functions of Trade Unions.

UNIT 5 PROFESSIONAL ETHICS

9 Hrs.

Ethics in Workplace - Formulation of Ethics - Managerial Ethics - Managing Ethical Behaviour - Codes of Ethics - Encouraging Ethical Behaviour - **Ethical Leadership** - Ethical Decision making. Corporate Social Responsibility (CSR) - Intellectual Property Rights (IPR)- Meaning- **Laws relating to Intellectual Property Rights (IPRs)**

Max. 45 Hours.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 : Comprehend various management principles and practices followed in industries
- CO2 : Analyze the types of business organization, plant layout and its safety measures.
- CO3 : Develop appropriate behavior as an individual and as a team to excel in industries..
- CO4 : Develop expertise knowledge on the impact of Leadership Communication and Group dynamics in industry
- CO5 : Comprehend the basics of ethical behavior and corporate social responsibility practiced in industries.
- CO6 : Investigate business cases by applying the ethical guidelines in industrial real life situations.

TEXT / REFERENCE BOOKS

- Gupta C.B., Management Theory and Practice, 14th Edition, Sultan Chand & Sons, 2009.
- Dr. Prasad L.M., Principle & Practice of Management, 7th Edition, Sultan Chand & Sons, 2008
- Aswathappa, Organisational Behaviour, 8th Edition, Himalaya Publishing House, 2010.
- Dr. Prasad L.M., Organisational Behaviour, 4th Edition, Sultan Chand & Sons, 2008
- Harold Koontz, Principles of Management, 1st Edition, Tata McGraw Hill, 2004.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 5 questions from each unit of internal choice, each carrying 12 marks

80 Marks

SBS1102	OBJECT ORIENTED PROGRAMMING WITH C++	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To learn the basic concepts object oriented programming and implement in many real time applications.

UNIT I

(9 Hrs)

Object Oriented Programming Paradigms - Comparison of Programming Paradigms – Object Oriented Languages- Benefits of Object Oriented Programming - Comparison with C - Structure of C++ program. Characteristics of Object Oriented Programming.

UNIT II

(9 Hrs)

Working with classes – **Classes and objects** – Class specification-Class objects-Accessing class members-Defining class members-Inline functions-Accessing member functions within class-Data hiding-Class member accessibility-Empty classes, constructors-Parameterized constructors-**Constructor overloading**-Copy constructors-new, delete operators-**"this" pointer**-friend classes and friend functions-Function overloading-Operator overloading.

UNIT III

(9 Hrs)

Base class and derived class relationship-Derived class declaration-Forms of inheritance-Inheritance and member accessibility-Constructors in derived class-Destructors in derived class-**Multiple inheritance**-Multi level inheritance-**Hybrid inheritance**-**Virtual base classes**-**Member function overriding**-**Virtual functions**.

UNIT IV

(9 Hrs)

I/O Stream - File I/O - Exception Handling - Templates – Generic Functions-Generic Class-STL – Library Organization and Containers – Standard Containers - Overview of Standard Algorithms-Iterators and Allocators.

UNIT V

(9 Hrs)

Development Process – Management - Object Identification – Components - **Object Oriented Design Fundamentals** – Case Studies.

COURSE OUTCOMES

- Comprehend the concept of Procedure Oriented and Object Oriented Programming.
- Apply data hiding and inline functions in object oriented programming.
- Analyze the concept of constructors, overloading and friend functions.
- Develop programs for code reusability using inheritance, virtual functions and Abstract class.
- Create an application using C++ for implementing Exception Handling and Files.
- Develop programs using advanced features of C++ specifically templates STL, iterators and allocators for real world problems.

TEXT BOOKS

- Herbert Schildt, The Complete Reference C++ - Third edition - Tata McGrawHill -2003.
- Balagurusamy, Object Oriented Programming with C++,Tata McGraw Hill,4th Edition
- Venugopal.K.R, Rajkumar, Ravishankar.T, Mastering C++, Tata McGraw Hill – 2003.
- Bjarne Stroustrup, The C++ Programmers Reference- 3rd Edition - Addison Wesley- 2000.

USEFUL WEBSITE:

http://www.tutorialspoint.com/cplusplus/cpp_overview.htm
www.compgeom.com/~piyush/teach/3330/slides/index.html

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1103	DIGITAL COMPUTER FUNDAMENTALS	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To Understand the concept of digital systems
- To operate on various number systems and Simplify Boolean functions.
- To Distinguish logical and combinational circuits
- To Design counters and understand the working of arithmetic logic and control unit

UNIT I

(9 Hrs)

Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.

UNIT II

(9 Hrs)

Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method.

UNIT III

(9 Hrs)

Sequential logic - RS, JK, D and T Flip flops - Registers - Shift Registers - Counters - Ripple Counters - Synchronous Counter - Design of Counters.

UNIT IV

(9 Hrs)

Adders - Subtractors - Decoders - Encoders - Multiplexer - Demultiplexer - Design of Circuits using decoders/Multiplexers - ROM - PLA - Designing circuits using ROM/PLA.

UNIT V

(9 Hrs)

Design of ALU - Design of Status Register - Design of accumulator - Introduction to Computer Design.

COURSE OUTCOMES

- CO1 - To Understand the concept of digital systems
 CO2 - To operate on various number systems and Simplify Boolean functions.
 CO3 - To Distinguish logical and combinational circuits
 CO4 - To Design counters and understand the working of counters
 CO5 - To Design arithmetic logic and control unit
 CO6 - To evaluate the combinational circuits

TEXT BOOKS

1. M. Morris Mano, "Computer System Architecture", Pearson Education, 2008.
2. Carter Nicholas, "Computer Architecture", Schaun outline Seives, Tata McGraw-Hill, 2008.
3. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

60 Marks

SBS1201	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- It focuses on how to organize VCDSQe data for more efficient problem solving using data structures methods and techniques.
- To impart the basic concepts of data structures and algorithms
- To be familiar with writing recursive methods.
- To understand concepts about searching and sorting techniques.
- To implement basic concepts about stacks.
- To apply the concepts of queues and its types

UNIT I

(9 Hrs)

Arrays- Linked List - Single Linked List - Insertion and Deletion - Doubly Linked List.-Circular Linked List – Stack- Queues- Array implementation of a Stack and queue - Linked List implementation of a Stack and Queue- Priority Queues

UNIT II

(9Hrs)

Evaluation of arithmetic expression using stack- Prefix –Infix-Postfix-notations, Converting infix expressions to postfix- Evaluation of postfix expression, -Towers of Hanoi problem.

UNIT III

(9 Hrs)

Tree Structures: Binary Trees- Implementation of Binary Trees- Linear Representation of Binary Tree-Linked representation of a Binary Tree. Binary Tree Traversal: Pre order – In order - Post order.

UNIT IV

(9 Hrs)

Sorting Techniques: Bubble Sort- Merge Sort - Shell Sort- Insertion Sort- Selection Sort-Quick Sort- Heap Sort.
Searching Techniques: Sequential Search- Binary Search-Hashing- Indexing.

UNIT V

(9 Hrs)

Graphs and Networks: Implementation of Graphs - Adjacency Matrix- Depth First Search-Breath First Search. Networks: Minimum Spanning Tree - The Shortest path Algorithm.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the concept of recursive algorithms.
- CO2 - Demonstrate the different types of data structures.
- CO3 - Able to understand the operations on linear data structures.
- CO4 - Summarize searching and sorting techniques.
- CO5 - Choose appropriate data structure as applied to specified problem definition.
- CO6 - Understand and implement the applications of linear data structures.

TEXT BOOKS:

1. E. Horowitz, S. Sahni, Fundamentals of Data Structures.
2. Bhagat Singh and Thomas L, Introduction to Data Structures, Naps, TMH.

Reference Books:

1. Helieman, Data Structures, Algorithms and Object Oriented Programming.
2. Thomas H Coreman, Charles E Leiseron, Ronald L Rivest, Introduction to Algorithms, PHI 2002.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1202	JAVA PROGRAMMING	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To understand and apply the fundamentals core java, packages, database connectivity for computing
- To provide knowledge on advanced features like Swing, JavaBeans, Sockets
- To understand the principles and concepts of object oriented programming
- To Store and retrieve the information from Files.
- To learn multithreading concepts

UNIT I

(9 Hrs)

An Overview of Java - Features of Java - Object oriented concepts - Lexical Issues - Data Types - Variables - Type Conversions and Casting - Arrays - Operators - Control Statements.

UNIT II

(9 Hrs)

Introduction to **Classes and Objects** - Declaring Objects and Methods - **Constructors** - this keyword - finalize() method- **Overloading Methods** - **Overloading Constructors** - **Recursion** - **Access Control** - **Static and Final methods and variables** - **Nested and Inner class** - **String class** - **String Handling**

UNIT III

(9 Hrs)

Inheritance - Using super - **Overriding Methods** - **Abstract classes** - **Final with Inheritance** – **Multi Threaded programming**

UNIT IV

(9 Hrs)

Packages - **Access Protection** – **Importing Packages** – **Interfaces** – **Exception Handling** – throw and throws. – **String tokenizer** – **Date** – **Calendar**- **Random**.

UNIT V

(9 Hrs)

Applet - **AWT Controls** - **Layout Managers and Menus**- **Swing** - **JDBC/ODBC Connection**

COURSE OUTCOME

- CO1 - To understand the principles and concepts of object oriented programming
 CO2 - To Store and retrieve the information from Files.
 CO3 - To learn multithreading concepts
 CO4 - Implement the interface, package and multithread concepts
 CO5 - Implement various built in package and its applications
 CO6 - Develop web based applications using applet programming

TEXT BOOKS

1. Herbert Schildt, The Complete Reference JAVA2, 7th Edition, McGraw-Hill/Osborne Media.

REFERENCE BOOKS

1. Bruce Eckel, Thinking in Java, 4th edition, Prentice Hall
2. Michael Morrison, Java Unleashed, 3rd edition, SAMS Publishing
3. Clayton Walnum, Java By Example, QUE Publications, 2000.
4. K. Arnold and J. Gosling, The JAVA programming language, Third edition, Pearson Education, 2000.
- 5.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

60 Marks

SBS1203	COMPUTER ARCHITECTURE	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To design and analyze the main functional units of computer and to understand the combinational and sequential circuits.
- Implementing assembly programs that accomplish basic computational and I/O operations.
- To impart knowledge on various types of Registers and Microinstructions.
- To discuss about the Data path design and Processor design in detail.
- To understand the types of memory organizations.
- To discuss about the registers, interface and communication in I/O devices.
- To analyze about the characteristics, structure communication and synchronization of multiprocessors.

UNIT I (9 Hrs)

Number systems - Conversion from one number system to another - Compliments - Binary codes - Binary logic - Binary Arithmetic - Logic gates - Truth tables. Boolean Algebra - Axioms - Truth table simplification of Boolean function - Map method - Mc-Clausky tabulation method.

UNIT II (9 Hrs)

Combinational Logic: Adders - Subtractors - Decoders - Encoders - Multiplexer – Demultiplexer Sequential logic: RS, JK, D and T Flip flops - Registers -Shift Registers Counters - Design of Counters.

UNIT III (9 Hrs)

Associative Memory – Cache Memory – Virtual Memory – Auxiliary Memory Memory Management Hardware. Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer: Handshaking – Serial Transfer – Communication Interface – Modes of Transfer – Priority Interrupt – DMA –Serial Communication-

UNIT IV (9 Hrs)

Introduction to micro computers, Microprocessors and Assembly languages - Microprocessor architecture and its operations - 8085 MPU - 8085 instruction set and Classifications.

UNIT V (9 Hrs)

Central Processing unit: General register and stack organizations, instruction formats - Addressing modes, Data transfer and manipulation - program control, RISC – Pipelining – Arithmetic and instruction, RISC pipeline – vector processing and array processors.

COURSE OUTCOMES

- CO1 - Classify the various types of registers, microinstructions and addressing modes.
CO2 - Design the data path for processor
CO3 - Demonstrate the usage of Memory Organization.
CO4 - Describe about the I/O devices.
CO5 - Explain the characteristics, structure, communication and synchronization of multiprocessor.
CO6 - State the inter processor communication and synchronization.

TEXT BOOKS

- M.Moris Mano, Computer system Architecture. PHI (Third edition, 1993)
- M.M. Mano, Digital Logic and Computer Design, Prentice Hall of India, 1994.

REFERENCE BOOKS

- Carl Hamacher, uonko G.Vranesic, Safwat G.Zaky – Computer Organisation, McGraw hill ISE 1987.
- John, P.Hayes., Computer System architecture, McGraw Hill, ISE,1988.
- Hwang.K.Briggs .F.A -Computer Architecture and parallel Processing, McGraw Hill ISE, 1988.
- T.C.Bartee, Computer Architecture and logical Design, McGraw Hill, 1991.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1204	SOFTWARE ENGINEERING	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- Knowledge of basic SW engineering methods and practices, and their appropriate application.
- A general understanding of software process models, role of project management, different software architectural styles and approaches to verification and validation
- Software process models and compare their applicability
- Identify the key activities in managing a software project
- Concepts of requirements engineering and Analysis Modelling
- Apply systematic procedure for software design and deployment

UNIT I

(9 Hrs)

Definition of software and software engineering – Software myths –Software Engineering paradigms: Linear Sequential Model and Prototyping Model-Incremental – Spiral Model- Iterative Model. Software Project Management. **Software Cost Estimation – Software Project Planning.**

UNIT II

(9 Hrs)

Introduction – The software requirement specifications – Formal specification techniques – **Languages and processors for requirements specification : SDAT, SSA, GIST, PSL/PSA, REL/REVS- Software prototyping** – rapid prototyping techniques- user interface prototyping- Analysis and modeling – data, functional and behavioral models – Structured analysis and data dictionary.

UNIT III

(9 Hrs)

Abstraction – Modularity – Software architecture – Cohesion, coupling – Various design concepts and notations – Real time and distributed system – Design – Documentation – Data flow oriented design – Jackson system development – Design for reuse – Programming standards. User interface Design- principles- SCM- Need for SCM- Version control – Introduction to SCM process – software configuration items

UNIT IV

(9 Hrs)

Levels - Test activities - **Types of s/w test - Black box testing** - Testing boundary condition - Structural testing- Test coverage criteria based on data flow mechanisms - Regression testing - Testing in the large- S/W testing strategies - Strategic approach and issues - Unit testing - **Integration testing - Validation testing - System testing and debugging. Case studies – Writing black box and white box testing**

UNIT V

(9 Hrs)

Introduction – **Quality assurance – Walk through and inspections – Static analysis – Symbolic execution- Software Maintenance:** Introduction – Enhancing maintainability during development- Managerial aspects of software maintenance – Configuration management – Source code metrics – **Other maintenance tools and techniques**

COURSE OUTCOMES

- CO1 - Identify and apply software lifecycle model for a given problem and will know the criteria for each level of CMM.
 CO2 - Comprehend types of requirements and summarize Requirement Engineering Process
 CO3 - Design data, functional and behavioral model for any given software requirement.
 CO4 - Identify and analyze levels of testing and perform white box testing and black box testing for a given problem.
 CO5 - Describe concepts of software quality assurance and software configuration management.
 CO6 - Compare and contrast forward engineering, reverse engineering and reengineering.

TEXT / REFERENCE BOOKS:

1. Pressman. R. S. ,Software Engineering - Fourth Edition- McGraw Hill International Edition 1997.
2. Richard Fairley, Software Engineering - (Design Reliability and Management), -Tata McGraw hill Edition -1983.
3. Fleeger.P Software Engineering, - Prentice Hall, 1999.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1205	DATABASE MANAGEMENT SYSTEM	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To gain knowledge in fundamentals of data models using ER diagram.
- To make a study of SQL and relational database design.
- To understand about Query processing, optimization and Concurrency control technique
- To understand terms related to database design and management
- To gain knowledge in relational model and relational database management system
- To implement relational databases using SQL & My SQL

UNIT I

(9 Hrs)

Basic Concepts: Database and Database users – Database system concepts and architecture – Data modeling using Entity Relationship model – Enhanced entity relationship and object modeling – Record storage and file organizations – Index Structures for files

UNIT II

(9 Hrs)

Relational Model: Languages and Systems: The Relational Data Model, Relational Constraints, and the relational Algebra – SQL – The Relational Database Standard – ER and EER to Relational Mapping and Other Relational Languages – Examples of Relational Database Management Systems: Oracle and Microsoft Access.

UNIT III

(9 Hrs)

Database Design: Theory and Methodology: Functional dependencies and normalization for relational database – Relational database design algorithms and further dependencies – Practical database design and tuning

UNIT IV

(9 Hrs)

System Implementation Techniques: Database system architectures and the system catalog – Query processing and optimization

UNIT V

(9 Hrs)

Transaction processing concepts – Concurrency control techniques – Database recovery techniques – Database security and Authorization. Introduction to Emerging Database Technologies and Application

COURSE OUTCOMES

- CO1 - Design ER-models to represent simple database application scenarios
- CO2 - Ability to understand and design data modelling using Entity-Relationship model
- CO3 - Implement SQL to a broad range of query and data update problems
- CO4 - Articulate socio-economic applications of distributed databases and use database recovery mechanisms
- CO5 - Familiar with data warehousing and data mining applications
- CO6 - Apply Normalization techniques to normalize and improve the database design

TEXT / REFERENCE BOOKS

1. Elmasri & Navathe , Fundamentals of Database Systems, 6th Edition, Addison Wesley, 2010
2. Korth ,Silberschatz & Sudarshan ,Database System Concepts ,5th Edition, Tata McGraw Hill, 2010
3. Raghu Ramakrishnan & Johannesgerhrke, Data Base Management Systems, 3rd Edition, Tata Mc Graw Hill, 2002

USEFUL WEBSITES

1. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design/index.php

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

60 Marks

SBS1206	OPERATING SYSTEM	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES :

- To learn how computers work and to learn about system design (performance vs. simplicity, HW vs. SW, etc.)
- To have an overview of different types of operating systems.
- To learn and implement the concept of process management.
- To observe the concept of storage management.
- To understand the concept of I/O and file systems.
- To learn the basics of Linux Programming

UNIT I

(9 Hrs)

Introduction: Operating system –Views and Goals - Types of System- OS Structure - Components - Services - System Structure - Layered Approach - Process Management: Process - **Process Scheduling** - Cooperating Process - Threads - Inter-process Communication.

UNIT II

(9 Hrs)

CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms. Process Synchronization: Critical-Section Problem - Synchronization Hardware - Semaphores Classical Problems of Synchronization - Critical Region - Monitors.

UNIT III

(9 Hrs)

Deadlocks: Characterization- Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

UNIT IV

(9 Hrs)

Memory Management: Address Binding - Dynamic Loading and Linking - Overlays - Logical and Physical Address Space - Contiguous Allocation- Non-Contiguous Allocation.

UNIT V

(9 Hrs)

File System: File Concepts - Access Methods - Directory Structures - Protection Consistency Semantics - File System Structures - Allocation Methods - Free Space Management.

COURSE OUTCOMES

- CO1 - Understand the fundamental components of a computer operating system and how computing resources are managed by the operating system.
- CO2 - Apply the concepts of CPU scheduling, synchronization and deadlocks in real computing problems.
- CO3 - Demonstrate the different memory and I/O management techniques used in Operating Systems.
- CO4 - Have practical exposure to the concepts of semaphores and monitors for process synchronization.
- CO5 - Create design and construct the following OS components: Schedulers, Memory management systems in the modern operating system.
- CO6 - Understand file system structure and implement a file system such as FAT.

TEXT BOOK

1. A. Silberschatz P.B.Galvin, Gange., Operating System Concepts, 6th Edition., Addison-Wesley Publishing Co., 2002.

REFERENCE BOOKS

1. H.M. Deitel, An Introduction to Operating System, Second Edition, Addison Wesley, 1990.
2. A.S. Godbole, Operating System-Tata McGraw Hill-1999.
3. William Stallings, Operating Systems, Fourth Edition, PHI.
4. Andrew S Tanenbaum, Operating Systems: Design and Implementation, Third Edition, PHI

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1207	CLOUD COMPUTING	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To articulate the main concepts, key technologies, strengths, and limitations of cloud computing
- To learn how to use Cloud Services.
- To implement Virtualization
- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and Multi-tenancy computing
- To study about various models of cloud environments and virtualization.
- To manage the cloud computing infrastructure with security.
- To gain knowledge of cloud and to understand about Fog, edge computing.

UNIT I

(9 Hrs)

The vision of cloud computing - **The cloud computing reference model** - Characteristics and benefits - Challenges ahead - Historical developments - Distributed systems - Virtualization - Building cloud computing environments - Application development - Infrastructure and system development - Computing platforms and technologies. Parallel vs. distributed computing - Elements of parallel computing - Hardware architectures for parallel processing Approaches to parallel programming - Laws of caution.

UNIT-II

(9 Hrs)

Introduction - The cloud reference model - Types of clouds - **Economics of the cloud Virtualization**: Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Pros and cons of virtualization - Technology example: VMware: full virtualization.

UNIT-III

(9 Hrs)

Anatomy of the Aneka container - Introducing parallelism for single-machine computation - Programming applications with threads - Multithreading with aneka - Programming applications with aneka threads. Cloud computing economics: Cloud infrastructure - Economics of private clouds - Software productivity in the cloud - Economies of scale: public vs. private clouds.

UNIT-IV

(9 Hrs)

Multi-entity support - Multi-schema approach - Multi-tenancy using cloud data stores - Data access control for enterprise applications. Data in the cloud: Relational databases - **Cloud file systems: GFS and HDFS - BigTable, HBase - Cloud data stores: Datastore and SimpleDB.**

UNIT-V

(9 Hrs)

Amazon web services: Compute services - Storage services - Communication services - Additional services. Google AppEngine: Architecture and core concepts - Application life cycle - Cost model - Observations. **Microsoft azure: Azure core concepts - SQL azure - Windows azure platform appliance.**

COURSE OUTCOMES

- CO1 - Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
 CO2 - Implement and install the cloud tools to make enable the cloud computing infrastructures.
 CO3 - Apply and design suitable Virtualization concept, Cloud Resource Management and collaboration services.
 CO4 - Create combinatorial auctions for cloud resources and services for computing clouds Develop and make cloud services as commercial.
 CO5 - Assess cloud and cloud to Fog with IoT.
 CO6 - Ability to, understand fog computing architecture

TEXT BOOKS

1. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing" - Foundations and Applications Programming, MK publications, 2013.
2. Gautam Shroff, "Enterprise Cloud Computing: Technology, Architecture, Applications" by Cambridge University Press, 2010.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

60 Marks

SBS1301	ADVANCED JAVA PROGRAMMING	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES:

- Develop client/server and web applications. Develop server side programs in the form of servlets and JSP
- To know about Enterprise architecture models
- To introduce the basics of session tracking
- To understand JSP and to write Custom Tags
- To be used in web enterprise applications.

UNIT I

(9 Hrs)

J2EE Platform– Enterprise Architecture Styles – J2EE API - J2EE Architecture for Containers – RMI Architecture- Overview of JNDI Java Database Connectivity –Introduction – Driver Types- Establishing a connection - Creating and Executing SQL Statement – Prepared Statement -The Result Set Object- java.sql package- Simple Application.

UNIT II

(9 Hrs)

Java Script:-Embedding Java Script In HTML - Variables - Literal - Conversion Functions - Arrays - Java Script Programming - Statements – Functions - Events Handling - Working With Objects – Date, Math, String, Window, Calendar -Connecting To Search Engines.

UNIT III

(9 Hrs)

Servlets- Background- Life Cycle of a Servlet- HTTP protocol- The Servlet API – Generic and Http Servlet- ServletConfig and ServletContext- Handling HTTP Requests and Responses- Handling form data with get and post request.

UNIT IV

(9 Hrs)

Advanced Servlets: Approach to Session Tracking - HTTP Session Interface – Demonstrating Session – Lifecycle with cookies – A simple Shopping cart using Sessions – Servlet Context Interface – Servlet Context Lifecycle – Event Handling – Servlet Collaboration – Servlet Chaining – Request Dispatching.

UNIT V

(9 Hrs)

Java Server Pages - JSP Technologies – Difference between Servlets and JSP- JSP Directives –Scripting elements - Standard Actions – Implicit Objects –Simple Application - Introduction to Enterprise Java Beans –Session Beans-Entity Beans-Message Driven Beans.

COURSE OUTCOMES

- CO1 - Implement JDBC connectivity
- CO2 - Implement Servlets and advanced Servlets
- CO3 - Implement JSP and Java Mail
- CO4 - Implement EJB
- CO5 - Implement Struts
- CO6 - To develop enterprise java applications thereby meeting the industrial requirements

TEXT BOOKS

1. Subrahmanyam Allamaraju, Cedric Buest, John Davies, Tyler Jewell, Rod Johnson, Andy Longshaw, Ramesh Nagappan, P. G. Sarang, Alex Toussaint, Sameer Tyagi, Gary Watson, Marc Wilcox, Alan Williamson, Professional Java Server Programming J2EE”, 1.3 Edition ,Wrox Publications
2. Patrick Naughton, Herbert Schildt, “The Complete Reference Java 2”,Third Edition, Tata McGraw hill
3. Thomas A. Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition,McGraw Hill/Osborne,
4. Jayson Falkner, Kevin Jones, “Servlets and JavaServer Pages,The J2EE Technology Web Tier”, Pearson Education

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1302	DATA COMMUNICATION AND COMPUTER NETWORKS	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To understand the concept of data communication and modulation techniques.
- To get a general overview of "Computer Networks"
- To know the functions of Data link layer
- To understand network layer functions and protocols used
- To learn about transport layer, session, presentation and application layer

UNIT I

(9 Hrs)

Introduction to Data Communication, Network. Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network OSI Model - Layers of OSI Model.

UNIT II

(9 Hrs)

Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530 EIA-202 and x.21 interface - Interface standards - Modems - Guided Media Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

UNIT III

(9 Hrs)

Multiplexing - types of Multiplexing - Multiplexing Application - Telephone systems project 802 - Ethernet - Token Bus - Token Ring FDD IEEE 802.6 - SMDS - Circuit Switching - Packet switching - Message switching Connection oriented and connectionless services.

UNIT IV

(9 Hrs)

History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN X.25 Layers - Packet Layer Protocol - ATM - ATM Technology - ATM protocol.

UNIT V

(9 Hrs)

Repeaters Bridges Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

COURSE OUTCOMES

- CO1 - To understand the concept of data communication and modulation techniques.
CO2 - To get a general overview of "Computer Networks"
CO3 - To know the functions of Data link layer
CO4 - To understand network layer functions and protocols used
CO5 - To learn about transport layer, session, presentation and application layer

TEXT BOOKS:

1. Behrouz and Forouzan - Introduction to Data Communication and Networking - 2nd Edition - TMH - 2001.
2. Jean Walrand Communication Networks (A first course) - Second Edition - WCB McGraw Hill - 1998.

REFERENCE BOOKS

1. Andrew S Tanenbaum ,Computer Networks,Third edition, Tata McGraw Hill,2006
2. Fred Halsall ,Data Communications, Computer Networks and Open Systems, 4th Edition , Addison Wesley,, 2000.

USEFUL WEBSITES

1. www.eeng.dcu.ie/~ee210/
2. www.cs.sfu.ca/CC/371/jcliu/Notes.htm
3. www.wepapers.com/Papers/51771/Notes_on___Computer_Networks

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1303	COMPUTER GRAPHICS AND MULTIMEDIA	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES:

- It aims at teaching about geometric information, 2D and 3D graphics, animation and multimedia.
- To introduce Two and Three dimensional graphical structure.
- To design 2D and 3D methods and Models
- To explore the visible surface detection with illumination and color models.
- To understand the concepts involved in multimedia and basis tools.
- To gain knowledge on Multimedia compression and animations

UNIT I

(9 Hrs)

Introduction to computer Graphics - Video display devices- Raster scan Systems - Random Scan Systems - Interactive input devices - Hard copy devices - Graphics software - Output primitives - line drawing algorithms - initializing lines - line function - circle Generating algorithms.

UNIT II

(9 Hrs)

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations- Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping-Text Clipping-Exterior Clipping.

UNIT III

(9 Hrs)

Three Dimensional Concepts - **3D Geometric and Modeling Transformations** – Three-Dimensional Viewing - Visible-Surface Detection Methods: Back-Face Detection - Depth-Buffer Method -Scan Line Method - A-Buffer Method-Depth Sorting Method-BSP Tree Method-Area Subdivision Method.

UNIT IV

(9 Hrs)

Multimedia – Definition- Introduction-Multimedia Software- Basic Tools- Multimedia Authoring Tools- Multimedia Building Blocks: Text- Font Editing and Design Tools – Hypermedia and Hypertext – Multimedia System Sounds – MIDI Versus Digital Audio – Making MIDI Audio – Audio File Formats– Adding Sound to Your Multimedia Project.

UNIT V

(9 Hrs)

Images: Making Still Images – Color – Image File Formats – Animation: The Power of Motion – Principles of Animation – Making Animations that Work – Video: Using Video – How Video works - Broadcast Video Standards – Integrating Computers and Television – Shooting and Editing Video – Video Tips – Recording Formats – Digital Video-Multimedia and the Internet

COURSE OUTCOMES

- CO1 - Identify the various line & circle drawing algorithm. Study the various transformations in 2D and 3D objects.
 CO2 - Understand the concepts of curves and surface.
 CO3 - Apply transformation and clipping algorithm in 2D and 3D objects.
 CO4 - Design Illumination and color models.
 CO5 - Implement 2D and 3D Transformation concepts in Real world Applications
 CO6 - To explore the visible surface detection with illumination and color models.

TEXT BOOKS

1. D. Hearn and M.P. Baker ,Computer Graphics, 2nd Edition ,PHI 1996
2. Tay Vaughan ,Multimedia: Making it Work,7th Edition, Tata McGraw Hill Edition ,2008

REFERENCE BOOKS

1. W.M. Neumann and R.F. Sproull ,Principle of Interactive Computer Graphics , McGraw Hill,2nd edition ,2002
2. Ranjan Parekh, Principles of multimedia – Sixth edition, Tata McGraw Hill – 2008

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1304	PYTHON PROGRAMMING	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To provide Basic knowledge of Python
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs
- To learn syntax of Python language
- To create dynamic applications in Python
- To implement object oriented concepts using Python

UNIT I

(9 Hrs)

Overview of Programming : Structure of a Python Program, Elements of Python.

UNIT II

(9 Hrs)

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

UNIT III

(9 Hrs)

Creating Python Programs :Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

UNIT IV

(9 Hrs)

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables.

UNIT V

(9 Hrs)

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists.

COURSE OUTCOMES

- CO1 - To provide Basic knowledge of Python
 CO2 - To learn how to design and program Python applications.
 CO3 - To learn how to use lists, tuples, and dictionaries in Python programs
 CO4 - To learn syntax of Python language
 CO5 - To create dynamic applications in Python
 CO6 - To implement object oriented concepts using Python

TEXT BOOKS

1. Allen Downey, Jeffrey Elkner, Chris Meyers.How to think like a computer scientist learning with Python / 1st Edition,2012

Useful websites:

- <http://docs.python.org/3/tutorial/index.html>
- <http://interactivepython.org/courselib/static/pythonds>
- <http://www.ibiblio.org/g2swap/byteofpython/read/>

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1603	MOBILE APPLICATION DEVELOPMENT	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To develop applications for current and emerging mobile computing devices, performing tasks at all stages of the software development life-cycle.
- To learn how to utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
- To understand the programming languages and platform for developing mobile applications.
- To design, implement and deploy mobile applications using an appropriate software development environment.
- To upload the developed application into the website.

UNIT I

(9 Hrs)

Introduction to Mobile Computing - Introduction to Android Development Environment - Factors in Developing Mobile Applications - Mobile Software Engineering - Frameworks and Tools - Generic UI Development - Android User

UNIT II

(9 Hrs)

Android Programming Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture. Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT III

(9 Hrs)

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. The manifest file - Layout resource - User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.

UNIT IV

(9 Hrs)

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu (Option Menu, Context Menu, Sub menu), Intents, Toast and Dialog-Tabs, Styles (Attributes) and Themes, Adapters – Array Adapters, Base Adapters – Notifications.

UNIT V

(9 Hrs)

Database: Understanding of SQLite database, connecting with the database. Threads – Maps – GPS – MMS – Sensors.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Learn and understand the technology and business trends impacting mobile applications.
- CO2 - Understand and remember the components of android, iOS and Windows mobile applications.
- CO3 - Learn the programming languages and techniques for developing mobile applications.
- CO4 - Design the mobile application by using Eclipse with ADT / Android Studio, Objective-C and Swift.
- CO5 - Develop mobile application with compelling user interface and database connectivity for real time applications.
- CO6 - Deploy mobile applications using an appropriate software development and finally, upload the developed App it into the web.

TEXT BOOKS

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

ONLINE READING / SUPPORTING MATERIAL

1. <http://www.developer.android.com>
2. <http://developer.android.com/about/versions/index.html>
3. <http://developer.android.com/training/basics/firstapp/index.html>
4. <http://docs.oracle.com/javase/tutorial/index.htm>
5. <http://developer.android.com/guide/components/activities.html>
6. <http://developer.android.com/guide/components/fundamentals.html>

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS1608	BIG DATA	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To understand the basics of Hadoop, MapReduce, Pig Latin
- Gain experience looking at analytics from a strategic perspective
- To become familiar with the fundamental concepts of Big Data
- To be competent in identifying the challenges in handling large volumes of data.
- To propose scalable solutions
- To understand the impact of Big Data in business intelligence, scientific discovery, and in day-to-day life.
- To learn the tools and techniques for handling large datasets.

UNIT I

(9 Hrs)

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools.

UNIT II

(9 Hrs)

Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce.

UNIT III

(9 Hrs)

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- How **Map Reduce** Works-Anatomy of a Map Reduce Job run- Failures-Job Scheduling-Shuffle and Sort – Task execution – Map Reduce Features

UNIT IV

(9 Hrs)

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance

UNIT V

(9 Hrs)

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper.

COURSE OUTCOMES

- CO1 - Configure the tools required for setting up Big Data Ecosystem
 CO2 - Understand conceptually how Big Data is stored and organized
 CO3 - Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues
 CO4 - Interpret data findings effectively in visual formats
 CO5 - Explore the fundamentals of various big data applications
 CO6 - Implement the Algorithms for data analytics

TEXT BOOKS

1. Michael Berthold, David J. Hand, (2007), "Intelligent Data Analysis", Springer.
2. Tom White (2012), "Hadoop:The Definitive Guide" Third Edition, O'reilly Media

REFERENCE BOOKS

1. AnandRajaraman and Jeffrey David Ullman, (2012), "Mining of Massive Datasets", Cambridge University

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

60 Marks

ELECTIVE 4

SBS1610	INTERNET OF THINGS	L	T	P	Credits	Total Marks
		4	0	0	4	100

COURSE OBJECTIVES

- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices

UNIT I

(9 Hrs)

M2M to IoT- The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

UNIT II

(9 Hrs)

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT III

(9 Hrs)

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, **Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.**

UNIT IV

(9 Hrs)

IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model.

UNIT V

(9 Hrs)

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration - Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1: Illustrate the technology and current trends in Internet of things.
 CO2: Understand the various elements of IoT system and hardware devices.
 CO3: Learn the programming languages and platforms for building IoT applications
 CO4: Demonstrate cloud computing and its relevance for developing IoT applications.
 CO5: Implement IoT applications that manage big data with data analytics and visualization tools.
 CO6: Implement hands-on projects using an appropriate software and hardware devices in various applications.

TEXT BOOKS

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.

REFERENCE BOOKS

1. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 80

PART A : 10 Questions of 2 marks each uniformly distributed – No choice

PART B : 2 Questions from each unit of internal choice, each carrying 10 marks

Exam Duration : 3 Hrs.

20 Marks

60 Marks

SBS4101	C LAB	L	T	P	Credits	Total Marks
		4	0	0	4	100

LIST OF PROGRAMS

1. Program to check whether a number is positive or negative or zero using if statement.
2. Program to check vowel or consonant using switch case statement.
3. Program to check whether a number is prime or not using while statement.
4. Program to generate multiplication table using do...while statement.
5. Program to check the given string is palindrome or not using for statement.
6. Program to display Fibonacci series.
7. Program to search an element in an array using linear search method.
8. Program to find the smallest and largest number among 'n' numbers.
9. Program to sort elements in an array.
10. Program to add two matrices.
11. Program for manipulating the strings using string handling functions.
12. Program to find the sum of 'n' numbers by making function.
13. Program to calculate factorial of a number using recursion.
14. Program to generate the mark sheet of the student using structure.
15. Program to copy the content of one file to other file.
16. Program to read and print student details using structure pointer.

SBS4102	C++ LAB	L	T	P	Credits	Total Marks
		4	0	0	4	100

LIST OF PROGRAMS

1. Data types, Expressions, Control structures and I/O
2. Arrays.
3. String Handling.
4. Functions, Inline functions and default arguments.
5. Function overloading.
6. Pointers.
7. Classes and Objects .
8. Friend functions and friend classes .
9. Static members .
10. Operator Overloading.
11. Inheritance.
12. Virtual functions .
13. Exception Handling.
14. Files.
15. Templates and STL.

SBS4201	JAVA PROGRAMMING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF EXPERIMENTS

1. Substring removal from a String using StringBuffer class.
2. Determining the orders of the numbers generated randomly using Random class
3. Usage of Calendar class and manipulation
4. String manipulation using CharArray
5. Usage of Vector class
6. Implementing Thread based applications and exception handling
7. Application using synchronization such as Thread based, Class based and synchronized Statement Using Applets and swings
8. Working with frames and other controls
9. Working with Dialog and Menus
10. Working with Panel and Layout
11. Incorporating Graphics
12. Database creation for storing email addresses and manipulation using Swing

SBS4202	RDBMS LAB (ORACLE/MYSQL)	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF EXPERIMENTS

1. Using Oracle DDL Commands:

To create a table

To alter a table

To drop a table

To create a view

To drop a view

2. Using Oracle DML Commands:

To insert, delete and update rows into a table

To write a simple queries using SELECT

To write queries using SELECT and WHERE clause

To write queries using Logical operators

To write queries using NULL

To write queries using NVL function

To write queries for pattern matching

To write queries using order by clause

To write queries using Distinct clause

To write queries using Arithmetic Expressions

To write queries using Arithmetic Function

To write queries using Group Function

To write queries using Group by Clause

To write queries using Having clause

To write queries using Character Function

To write queries using Date Function

To write queries using Sub queries

To write queries using Join

3. Using PL/SQL:

To create Cursor and work on that

To create PL/SQL code for Exception

To create PL/SQL code using Control Statement

To create PL/SQL code using Procedures and Functions

SBS4301	ADVANCED JAVA PROGRAMMING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

LIST OF EXPERIMENTS

1. Write an Application for Student Information System using JDBC and AWT
2. Write an Application for Library Information System using JDBC and AWT
3. Client validation using JavaScript
4. Write a program to demonstrate event handling in JavaScript.
5. Web Application using servlet to demonstrate the Http Handling(GetRequest)
6. Web Application using servlet to demonstrate the Http Handling(PostRequest)
7. Write a servlet program to demonstrate the cookie.
8. Write a servlet program to demonstrate the URL Rewriting.
9. Simple shopping cart application using JSP
10. Banking Application using JSP Use Bean Methods.

SBS4302	PYTHON LAB	L	T	P	Credits	Total Marks
		4	0	0	4	100

LIST OF PROGRAMS

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria : Grade A: Percentage ≥ 80 Grade B: Percentage ≥ 70 and ≤ 60 and ≤ 40 and
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - \dots - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.
8. Write a menu-driven program to create mathematical 3D objects I. curve II. sphere III. cone IV. arrow V. ring VI. Cylinder.
9. WAP to read n integers and display them as a histogram.
10. WAP to display sine, cosine, polynomial and exponential curves.
11. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
12. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t \geq 0$.
13. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows: $P(t) = (15000(1+t))/(15+e)$ where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.