Note: Removed Contents are marked in Yellow color and
Added Contents are texted in red color

SCSX1006	DIGITAL COMPUTER FUNDAMENTALS (Common to CSE & IT)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I NUMBER SYSTEMS,COMPLIMENTS AND CODES 10 hrs.

Number Systems – Conversion from one base to another – Complements – Algorithms for r’s and (r-1)’s complements – Sign, Floating Point Representations- Signed Arithmetic –BCD number representation – Alphanumeric codes ASCII/EBCDIC – Parity Check – Error Detection, Hamming Code- Generation, Error Correction, Reflection and Self Complementary codes.

UNIT II BOOLEAN ALGEBRA 10 hrs.

Gates – OR – AND – NOT- NAND & NOR – Fundamental Concept of Boolean Algebra – Basic Laws of Boolean Algebra – De morgan’s Theorem – Derivation of Boolean expression – Inter Connection of Gates – Canonical form of expression – SOP and POS – Don’t Cares – Simplification of Boolean Expressions: Karnaugh maps – Quine– McClusky method.

UNIT III COMBINATIONAL LOGIC DESIGN 10 hrs.

Adder – Subtracter – Code Conversion – Analysing a Combinational – Logic Design using NAND/NOR, NAND- to -AND and NOR -to- OR gate networks – Binary parallel adder – Decimal adder – BCD adder – Magnitude Comparator – Decoders – Demultiplexer – Encoder – Multiplexers

UNIT IV SEQUENTIAL LOGIC DESIGN 10 hrs.

Flip Flops – Analyzing a sequential circuit –State Diagram, State Table,State Equations– State Reduction– Synchronous and Asynchronous Circuits- Design of Synchronous Counters – Binary and BCD Counters – Ripple Counters-Binary Ripple Counter, BCD Ripple Counter-Shift Registers

UNIT V MEMORY UNIT 10 hrs.

Memory Unit – ROM – PROM, EPROM, EEPROM – RAM – SRAM,DRAM – Storage Hierarchy – Virtual Memory– Cache Memory Design of Simple Computer-Design of Arithmetic Unit- Design of Logic Unit- Processor Unit

REFERENCE BOOKS:

1. Morris Mano, “Digital Logic & Computer Design”, Prentice Hall of India, 2006
2. Thomas.C.Bartee, “Computer Architecture & Logic Design”, McGraw-Hill, 1991
3. A.P.Malvino and D.P.Leach, “Digital Principles and Applications”,th6Edition, McGraw-Hill, 2006.
4. Thomas L Floyd, "Digital Fundamentals", 1th0 Edition, Pearson Education, 2009
5. Thomas C. Bartee, "Computer Architecture Logic Design", rd3 Edition,2002

UNIVERSITY EXAM QUESTION PAPER PATTERN

Max Marks : 80 Exam Duration : 3 hrs.

Part A: 2 Questions from each unit, each carrying 2 marks 20 Marks

PART B:2 Questions from each unit with internal choice, each carrying 16 marks 80 Marks

SCS1203	FUNDAMENTALS OF DIGITAL SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 NUMBER SYSTEMS, COMPLIMENTS AND CODES **9 Hrs.**

Number Systems - Binary Numbers - Number base conversions - Octal and Hexa Decimal Numbers - Complements - Signed Binary Numbers - Binary Arithmetic - Binary Codes - Decimal Code - Error Detection code - Gray Code- Reflection and Self Complementary codes - BCD number representation - Alphanumeric codes ASCII/EBCDIC - Hamming Code- Generation, Error Correction.

UNIT 2 BOOLEAN ALGEBRA AND LOGIC GATES **9 Hrs.**

Axiomatic definitions of Boolean Algebra - Basic Theorems and Properties of Boolean Algebra - Boolean Functions- Canonical and Standard forms - Digital Logic Gates- Simplification of Boolean Expressions: The map method- SOP and POS - NAND and NOR implementation - Don't Cares - The Tabulation Method - Determination and Selection of Prime Implicants

UNIT3 COMBINATIONAL LOGIC **9 Hrs.**

Design Procedure - Adder - Subtractor - Code Conversion - Analysis Procedure - Multilevel NAND/NOR circuits - Exclusive OR functions - Binary adder and subtractor- Decimal adder - BCD adder - Magnitude Comparator - Decoders - Demultiplexer - Encoder - Multiplexers

UNIT 4 SYNCHRONOUS SEQUENTIAL LOGIC **9 Hrs.**

Flip Flops - Analysis of clocked sequential circuit - Reduction and Assignments - Flip flop excitation tables - Design Procedure - Design of counters - Registers - Shift registers - Synchronous Counters - Timing sequences - Algorithmic State Machines - ASM chart - timing considerations - control implementation.

UNIT 5 ASYNCHRONOUS SEQUENTIAL LOGIC AND MEMORY **9 Hrs.**

Circuits with Latches - Analysis procedure and Design Procedure - Reduction of state and Flow tables - Race - Free State Assignment

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Solve problems pertaining to representation, conversion and manipulation of various number systems and binary codes.

CO2 : Represent, analyze and simplify a logical task applying principles of Boolean algebra and design a logical circuit for delivering the functionality.

CO3 : Design simple devices that can be built using basic arithmetic and logic circuits.

CO4 : Model an application using Algorithmic State Machines that in turn are built using basic logic devices.

CO5 : Design and Inspect asynchronous sequential logic.

CO6 : Design applications using different combinational, sequential logic circuits and relate to computer systems in terms of digital logic circuits.

TEXT / REFERENCE BOOKS

1. Morris Mano, “Digital Logic & Computer Design”, Prentice Hall India, 2006.
2. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education, 2009.
3. Thomas.C.Bartee, “Computer Architecture & Logic Design”, McGraw-Hill, 1991.
4. P.Malvino and D.P.Leach, “Digital Principles and Applications”, 6th Edition, McGraw-Hill, 2006.
5. Thomas C. Bartee, "Computer Architecture Logic Design", 3rd Edition, 2002.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs.**

PART A: 2 Questions from each unit, each carrying 2 marks 20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks 80 Marks

SCSX1003	**PROGRAMMING IN C++** (Common to all Branches)	**L**	**T**	**P**	**Credits**	**Total Marks**
		3	**0**	**0**	**3**	**100**

UNIT I INTRODUCTION TO C++ 10 hrs.

Object Oriented Programming Paradigms - Comparison of Programming Paradigms – Object Oriented Languages - Benefits of Object Oriented Programming - Comparison with C - Overview of C++ -Pointers-References and Structures - Functions - Scope and Namespaces - Source Files and Programs.

UNIT II CLASSES AND OBJECTS 10 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 DERIVED CLASSES 10 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 I/O AND LIBRARY ORGANIZATION 10 hrs.

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

UNIT V OBJECT ORIENTED DESIGN 10 hrs.

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

TEXT BOOKS:

1. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hil^{t}l^{h},4Edition,2010
2. Venu Gopal.K.R, Ravishankar.T, and Raj kumar, "Mastering C++", Tata McGraw Hill,1999.

REFERENCE BOOKS:

1. Bjarne Stroustrup, "The C++ programming language", Addision Wesley^{r},^{d}3Edition,1998.
2. John R Hubbard, "Programming with C++", Schaums Outline Series, McGraw Hill^{n},^{d}2edition, 2009.
3. James Martin & James J.Odell,"Object Oriented methods-A foundation",Prentice Hall,1997.
4. Grady Booch, "Object Oriented Analysis and Design with application", Addision Wesley^{n},^{d} 2Edition ,1994.

UNIVERSITY EXAM QUESTION PAPER PATTERN

Max Marks: 80 Exam Duration: 3 hrs.

Part A: 2 Questions from each unit, each carrying 2 marks 20 marks

Part B:2 Questions from each unit with internal choice, each carrying 16 marks 80 Marks

SCS1202	OBJECT ORIENTED PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING 9 Hrs.

Object Oriented Programming Paradigms - Comparison of Programming Paradigms - Basic Object Oriented Programming concepts - Comparison with C - Overview of C++ - Pointers - Functions - Scope and Namespaces - Source files and programs.

UNIT 2 CLASSES AND OBJECTS 9 Hrs.

Working with classes - Classes and objects - Class specification - Defining class members - Objects Accessing member functions - Inline Functions - Data hiding - Class member accessibility - Empty classes.

UNIT 3 CONSTRUCTORS AND OVERLOADING 9 Hrs.

Default constructors - Parameterized constructors - Constructor overloading - Copy constructors - new, delete operators-"this" pointer - friend classes and friend functions - Function overloading- Unary Operator overloading - Binary Operator overloading.

UNIT 4 INHERITANCE 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 - Abstract classes - Pure Virtual functions.

UNIT 5 I/O AND LIBRARY ORGANIZATION 9 Hrs.

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

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Comprehend the concept of Procedure Oriented and Object Oriented Programming.
CO2 : Apply data hiding and inline functions in object oriented programming.
CO3 : Analyze the concept of constructors, overloading and friend functions
CO4 : Develop programs for code reusability using inheritance, virtual functions and Abstract class
CO5 : Create an application using C++ for implementing Exception Handling and Files.
CO6 : Develop programs using advanced features of C++ specifically templates STL, iterators and allocators for real world problems.

TEXT / REFERENCE BOOKS

1. Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill,4th Edition,2010.
2. Venu Gopal K.R, Ravishankar.T, and Raj kumar, "Mastering C++", Tata McGraw Hill,1999.
3. Bjarne Stroustrup, "The C++ programming language", Addision Wesley, 3rd Edition,1998.
4. John R Hubbard, "Programming with C++", Schaums Outline Series, McGraw Hill, 2nd edition, 2009.
5. James Martin & James J.Odell,"Object Oriented methods - A foundation", Prentice Hall,1 997.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs.**

PART A: 2 Questions from each unit, each carrying 2 marks 20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks 80 Marks

<table>
<tr><td rowspan="2">SCSX4003</td><td rowspan="2">PROGRAMMING IN C++ LAB</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td>Total Marks</td></tr>
<tr><td>0</td><td>0</td><td>4</td><td>2</td><td>100</td></tr>
</table>

LIST OF EXPERIMENTS

1. Write a program to calculate final velocity using the formula: v=u + a*t, with initial velocity, acceleration and time as input.
2. Write a program to swap two characters of different data types using function overloading concept.
3. Write a program to change the sign of an operands using unary operator overloading concept.
4. Write a program to add two complex numbers using binary operator overloading concept.
5. Write a program to find mean value of two integers using friend function concept.
6. Write a program to multiple and divide two different data type using inline function concept.
7. Write a program to Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
8. Write a program to enter the sale value and print the agent's commission using single inheritance.
9. Write a program to enter salary and output income tax and net salary using multiple inheritance concept.
10. Write a program to enter the unit reading and output the customer's telephone bill using hierarchical inheritance.
11. Write a program to find the grade of the students based on academic marks and sports using multilevel inheritance.
12. Write a program having student as an abstract class and create many derived classes such as Engineering, Medical etc from student's class. Create their objects and process them.
13. Write a program to count the words and characters in given text using virtual function.
14. Write a program to calculate net pay of employee using virtual base class concept.
15. Write a program to calculate division of two number with a try block to detect and throw an exception if the condition" divide -by-zero" occurs.

		L	T	P	Credits	Total Marks
SCS4201	**OBJECT ORIENTED PROGRAMMING LAB**	**0**	**0**	**4**	**2**	**100**

SUGGESTED LIST OF EXPERIMENTS

1. Develop a C++ program to implement a class, object creation, member function invocation concept.
2. Develop a C++ program to implement the various constructors and destructor concept.
3. Develop a C++ program to implement a friend function, Inline function.
4. Develop a C++ program to implement an operator (Unary & Binary) overloading concept.
5. Develop a C++ program to implement a function overloading concept.
6. Develop a C++ program to implement a run time polymorphism.
7. Develop a C++ program to implement the following inheritance types.
   a. Single
   b. Multiple
   c. Multilevel
   d. Hierarchical
   e. Hybrid
8. Develop a C++ program to implement an Abstract class concept.
9. Develop a C++ program to implement a Virtual function.
10. Develop a C++ program to find the number of characters in a file.
11. Develop a C++ program to handle the exceptions.

Case Study

1. Categorization of living beings as humans, animals, birds, insects, etc.., using inheritance.
2. Develop user defined manipulator for the following named
   a) Rupees for displaying Rs. and sets the precision to 2.
   b) Dollar for displaying $.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1	:	Design object-oriented paradigm with concepts of streams, classes, functions, data and objects.
CO2	:	Develop a Program to initialize and destroy objects using Constructor, destructor function.
CO3	:	Build a program using the concepts of function overloading and operator overloading.
CO4	:	Implement Inheritance concept in real time applications.
CO5	:	Construct programs using Abstract Class and Virtual function.
CO6	:	Create an application using C++ for implementing File and Exceptional Handling.