

SCSA1104	PROBLEM SOLVING TECHNIQUES WITH C AND C++	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To learn the fundamentals of PST and methodologies which are essential for building good C/C++ programs.
- 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 demonstrate adeptness of object-oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.

UNIT 1 INTRODUCTION TO COMPUTER PROBLEM SOLVING

9 Hrs.

Algorithms - Building blocks of algorithms (statements, control flow, functions) -Notation (pseudo code, flow chart) -Algorithmic problem solving for socio economic conditions in global perspectives - Simple strategies for developing algorithms (iteration, recursion) - Efficiency of algorithms.

UNIT 2 BASICS OF C PROGRAMMING

9 Hrs.

Introduction to C: Features of C - Structure of C Program-Data Types- 'C' Tokens-Input/output statements-Control Statement, Functions: – Types of Functions –Recursion

Algorithms: Reversing the digits of a number - Generation of Fibonacci sequence- Factorial Computation.

UNIT 3 ARRAYS, STRINGS AND STRUCTURES

9 Hrs.

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.

Algorithms: Sum of array elements- Removal of duplicates from an array-Finding the Kth smallest element.

UNIT 4 POINTERS AND FILE PROCESSING

9 Hrs.

Pointers: Introduction, Arrays Using Pointers – Structures Using Pointers – Functions Using Pointer, Dynamic Memory Allocation, Storage Classes, File Handling in 'C'.

Algorithms: Swap elements using Call by Reference – Sorting Arrays using pointers-Finding sum of array elements using Dynamic Memory Allocation.

UNIT 5 OBJECT ORIENTED PROGRAMMING CONCEPTS

9 Hrs.

Introduction-Procedure vs. object-oriented programming-Concepts: Classes and Objects-Operator & Function Overloading-Inheritance-Polymorphism and Virtual Functions.

Max.45 Hrs.

COURSE OUTCOMES

On completion of the course the student will be able to

- CO1: Develop solutions for the given problem.
- 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. Dromey.R. G, "How to Solve it by Computer", Prentice-Hall of India, 8th Indian Reprint, 2008.
2. Aho.A.V., Hopcroft.J. E and Ullman.J.D. D, "The Design and Analysis of Computer Algorithms", Pearson education, 2004.Deitel and Deitel, C how to Program, 7th Edition, Pearson Education, 2013.
3. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education, 2015.
4. Bhave, Object Oriented Programming with C++, Pearson Education, 2004.
5. John R Hubbard, "Programming with C++", Schaums Outline Series, McGraw Hill, 2nd edition, 2009.
6. Bjarne Stroustrup, Programming: Principles and Practice using C++, 1st Edition, Addison Wesley Publications, 2008.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

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

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

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SCSA1201	FUNDAMENTALS OF DIGITAL SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand number systems and codes.
- To illustrate simplified Boolean expressions using Gates.
- To construct combinational logic circuits.
- To design sequential logic circuits.
- To analyze circuits and latches.

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.

UNIT 3 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 UNIT**9 Hrs.**

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

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Perform conversions between number systems.
- CO2 - Simplify Boolean expressions and model using gates.
- CO3 - Discover the principles behind combinational logic circuits used in real time.
- CO4 - Survey the flip-flops needed for sequential logic circuits design.
- CO5 - Analyze the sequential logic circuits.
- CO6 - Discuss about memory unit and arithmetic logic unit.

TEXT / REFERENCE BOOKS

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

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

SCSA1204	PYTHON PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand why Python is a useful scripting language for developers.
- To learn how to use lists, tuples, and dictionaries in Python programs.
- To build and package Python modules for reusability.
- To understand how to read and write files in Python.
- To learn how to use exception handling in Python applications for error handling.
- To design and program Python applications.

UNIT 1 INTRODUCTION**9Hrs.**

History of Python- Introduction to the IDLE interpreter (shell) - Data Types - Built-in function - Conditional statements - Iterative statements- Input/output functions - Compound Data Types - Nested compound statements – Introduction to Object Oriented Concepts.

UNIT 2 FILES AND EXCEPTIONS HANDLING, MODULES, PACKAGES**9Hrs.**

File Operations –Iterators - Exception handling - Regular Expressions- Creating Modules-Import Statement- Introduction to PIP-Installing Packages via PIP-Using Python Packages.

UNIT 3 GUI PROGRAMMING**9 Hrs.**

GUI Programming in Python - Introduction to GUI library - Layout management - Events and bindings - Fonts – Colours - Canvas - Widgets (frame, label, button, check box, entry, listbox, message, radiobutton, text, spinbox).

UNIT 4 DATABASE AND NETWORK**9Hrs.**

Database (using NoSQL): Connector Module –Cursor – Statements - Exceptions in database. Network connectivity: Socket module - Client – Server – Email – URLAccess.

UNIT 5 CASE STUDY**9Hrs.**

Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis.

Max. 45 Hrs.**COURSE OUTCOMES**

- CO1:** Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
- CO2:** Do the decision making and write functions in Python.
- CO3:** Explain how to design GUI Applications in Python and evaluate different database operations.
- CO4:** Design and develop Client Server network applications using Python.
- CO5:** Ability to design real life situational problems and think creatively about solutions of them.
- CO6:** Apply the best features of mathematics, engineering and natural sciences to program real life problems.

TEXT /REFERENCE BOOKS

1. Y. Daniel Liang, "Introduction to Programming Using Python", Pearson, 2013.
2. Python Notes for Professionals by Stack Overflow Documentation (<https://books.goalkicker.com/PythonBook/>)
3. Dr. Charles R. Severance, "Python for Everybody- Exploring Data Using Python 3", 2016.
4. Paul Gries, Jennifer Campbell, Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Pragmatic Bookshelf, 2nd Edition, 2014.
5. Magnus Lie Hetland, "Beginning Python: From Novice to Professional", Apress.

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