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

SCSX1010	OBJECT ORIENTED ANALYSIS AND DESIGN (Common to CSE & IT)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION 10 hrs.

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

UNIT II OBJECT ORIENTED METHODOLOGIES 10 hrs.

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 OBJECT-ORIENTED ANALYSIS 10 hrs.

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

UNIT IV OBJECT ORIENTED DESIGN 10 hrs.

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

UNIT V SOFTWARE QUALITY 10 hrs.

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

REFERENCE BOOKS:

1. Ali Bahrami, "Object oriented systems development using the unified modeling language^{s,,t}, E1dition, McGraw- Hill, 1998.
2. Grady Booch, James Rumbaugh, and Ivar Jacobson, "The Unified Modeling Language User Guiderd", E3dition Addison Wesley, 2007.
3. John Deacon, "Object Oriented Analysis and Design",st1Edition, Addison Wesly, 2005.

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

SCS1205	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 AN OVERVIEW OF OBJECT ORIENTED SYSTEM DEVELOPMENT **9 Hrs.**

Introduction - Object Oriented System Development Methodology - Why Object Orientation - Overview of Unified Approach - Object Basics: Object Oriented Philosophy - Objects - Classes - Attributes - Object Behavior and Methods, Encapsulation and Information Hiding - Class Hierarchy - Polymorphism - Object Relationships and Associations - Aggregations and Object Containment - Object Identity - Static and Dynamic Binding - Persistence. Object Oriented Systems Development Life Cycle: Software Development Process - Building High Quality Software - Usecase Driven Approach - Reusability.

UNIT 2 OBJECT ORIENTED METHODOLOGIES **9 Hrs**

Rumbaugh et al.'s Object Modeling Technique - Booch Methodology - Jacobson et al. Methodologies - Patterns - Framework - Unified approach - Unified Modeling Language:Static and Dynamic Model - UML Diagrams - UML Class Diagram - UML Usecase Diagram - UML Dynamic Modeling - UML Extensibility - UML Meta model.

UNIT 3 OBJECT ORIENTED ANALYSIS **9 Hrs.**

Business Object Analysis - Use Case Driven Object Oriented Analysis - Business Process Modeling - Use Case model - Developing Effective Documentation - Object Analysis Classification: Classification Theory - Noun Phrase Approach - Common Class Patterns Approach - Use-Case Driven Approach - Classes Responsibilities and Collaborators - Naming Classes - Identifying Object Relationships, Attributes and Methods: Association – Super Subclass Relationships - A-part of Relationships.

UNIT 4 OBJECT ORIENTED DESIGN **9 Hrs.**

Object Oriented Design Process - Object Oriented Design Axioms - Corollaries - Designing Classes: Object Constraint Language - Process of Designing Class - Class Visibility - Refining Attributes - Access Layer: Object Store and Persistence - Database Management System - Logical and Physical Database Organization and Access Control - Distributed Databases and Client Server Computing - Object Oriented Database Management System - Object Relational Systems - Designing Access Layer Classes - View Layer: Designing View Layer Classes - Macro Level Process - Micro Level Process - Purpose of View Layer Interface - Prototyping the user interface.

UNIT 5 SOFTWARE QUALITY **9 Hrs.**

Software Quality Assurance: Quality Assurance Test - Testing Strategies - Impact of Object Oriented Testing - Test Cases - Test Plan - Myers Debugging Principle - System Usability and Measuring User Satisfaction: Usability Testing - User Satisfaction Testing

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Comprehend the concepts of object oriented programming and development.
CO2 : Analyze the various object oriented development methodologies.
CO3 : Develop class diagrams using class identification methodologies.
CO4 : Design use case diagrams for various use case scenarios.
CO5 : Analyse the various quality assurance activities performed during object oriented development.
CO6 : Create detailed UML design diagrams for any given problem.

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. Bernd Oestereich, "Developing Software with UML, Object - Oriented Analysis and Design in Practice", Addison-Wesley, 2000.

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

SCSX1001	DESIGN AND ANALYSIS OF ALGORITHMS (Common to CSE & IT)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION TO COMPUTER PROBLEM SOLVING 10 hrs.

Introduction - The Problem-Solving aspect,top-down design-Implementation of Algorithms-program verification-The efficiency of algorithms-The analysis of algorithms-Fundamental Algorithms: Introduction-Exchanging the values of two variables-Counting-Summation of a set of Numbers-factorial computation-Sine function computation-Generation of the Fibonacci sequence-Reversing the digits of an integer,base conversion-Character to Number conversion.

UNIT II FACTORING METHOD 10 hrs.

Introduction - Finding the square root of a number-The smallest divisor of an integer-The greatest common divisor of two integers-Generating Prime Numbers-Computing the Prime Factors of an integer-Generation of Pseudo-random Numbers-Raising a Number to a Large Power-Computing the nth Fibonacci Number.

UNIT III ARRAY TECHNIQUES 10 hrs.

Introduction - Array Order Reversal-Array Counting or Histogramming-Finding the maximum Number in a Set-Removal of Duplicates from an Ordered Array-Partitioning an Array-Finding the kth smallest Element-Longest Monotone Subsequence.

UNIT IV MERGING SORTING AND SEARCHING 10 hrs.

Introduction - The Two-way Merge-Sorting by Selection-Sorting by Exchange-Sorting by Insertion-Sorting by Diminishing Increment-Sorting by Partitioning-Binary Search-Hash Searching.

UNIT V TEXT PROCESSING AND PATTERN SEARCHING 10 hrs.

Introduction -Text Line Length Adjustment-Left and Right Justification of Text-Keyword Searching in Text-Text Line Editing-Linear Pattern search-Sublinear Pattern Search.

REFERENCE BOOKS:

1. Dromey.R.G, “How to Solve it by Computer”, Prentice-Hall of India, 1996.
2. Aho.A.V., Hopcroft.J.E and Ullman.J.D, “The Design and Analysis of Computer Algorithms”, Pearsoenducation, 2004
3. Knuth,D.E., “The Art of computer programming Vol 1:Fundamental Algorithms”, rd3Edition, Addison Wesley, 1997
4. Knuth,D.E., “Mathematical Analysis of algorithms”, Proceedings IFIP congress, 1971

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

SCS1206	DESIGN AND ANALYSIS OF ALGORITHM	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION **9 Hrs.**

Fundamentals of Algorithmic Problem Solving - Time Complexity - Space complexity with examples - Growth of Functions - Asymptotic Notations: Big Oh, Little Oh, Omega, Theta - Properties - Complexity Analysis Examples - Performance measurement - Instance Size, Test Data, Experiment setup.

UNIT 2 MATHEMATICAL FOUNDATIONS **9 Hrs.**

Solving Recurrence Equations - Substitution Method - Recursion Tree Method - Master Method - Best Case - Worst Case - Average Case Analysis - Sorting in Linear Time - Lower bounds for Sorting - Counting Sort - Radix Sort - Bucket Sort

UNIT 3 DESIGN OF ALGORITHMS - BRUTE FORCE AND DIVIDE-AND-CONQUER **9 Hrs.**

Brute Force - Travelling Salesman Problem - Knapsack Problem - Assignment Problem - Closest Pair and Convex Hull Problems - Divide and Conquer Approach - Binary Search - Quick Sort - Merge Sort - Strassen's Matrix Multiplication.

UNIT 4 DESIGN OF ALGORITHMS - DYNAMIC PROGRAMMING AND GREEDY APPROACH **9 Hrs.**

Dynamic Programming - Floyd Warshall Algorithm - Optimal Binary Search Algorithms - Greedy Approach - Huffman Code - Kruskal's Algorithm - Prim's Algorithm - Dijkstra's Algorithm

UNIT 5 DESIGN OF ALGORITHMS - BACKTRACKING AND BRANCH AND BOUND **9 Hrs.**

Backtracking - 8 Queens - Hamiltonian Circuit Problem - Branch and Bound - Assignment Problem - Knapsack Problem - Travelling Salesman Problem - NP Complete Problems - Clique Problem - Vertex Cover Problem

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Analyze the efficiency of an algorithm based on time and space complexity.
CO2 : Apply mathematical principles for recursive analysis.
CO3 : Construct algorithms based on brute force and divide and conquer techniques and its real time applications.
CO4 : Design Solutions using dynamic and greedy approaches for real world problems.
CO5 : Design a solution by using Branch and Bound and backtracking techniques.
CO6 : Develop a solution for any given problem by choosing appropriate algorithm.

TEXT / REFERENCE BOOKS

1. Sartaj Sahni, "Data Structures, Algorithms, and Applications in C++", McGraw Hill, 2n d Edition, 2005.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
3. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
5. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.
6. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

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

SCSX1009	COMPUTER ARCHITECTURE &PARALLEL PROCESSING (Common to CSE, IT, E&I, E&C)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION 10 hrs.

Central Processing Unit – Introduction – General register organization – Stack organization – Instruction formats – Addressing modes – Data transfer and manipulation – Progam control – RISC – Data representation – Basic computer organization – Instruction codes – Computer registers – Computer instructions – Timing and control – Instruction cycle– Register transfer and microoperations – Register transfer language – Register transfer – Bus and memory transfers -Arithmetic ,Logic, Shift Microoperations – Arithmetic logic shift unit.

UNIT II PROCESSOR DESIGN 10 hrs.

Computer arithmetic – Addition – Subtraction – Multiplication and Division algorithms – Floating point arithmetic operations - Microprogrammed Control – Control memory – Address sequencing – Microprogram Example – Design of control unit.

UNIT III MEMORY AND I/O SYSTEM 10 hrs.

Memory Organization – Memory hierarchy – Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory – Memory managemant hardware.

Input-Output Organization – Peripheral devices – I/O interface – Asynchronous data transfer – Modes of transfer – Priority interrupt – DMA – IOP – Serial communication.

UNIT IV PIPELINING AND VECTOR PROCESSING 10 hrs.

Parallel processing – Pipelining – Arithmetic pipeline – Instruction pipiline – RISC pipeline – Vector processing – Array processors.

UNIT V MULTIPROCESSORS 10 hrs.

Characteristics of multiprocessors – Interconnection structures – Interprocessor arbitration – Interprocessor communication and synchronization – Cache coherance.

REFERENCE BOOKS:

1. M.Morris Mano, “Computer system Architecture”, r3d Edition, Prentice-Hall Publishers, 2007.
2. John P Hayes , “Computer architecture and Organization”,rd3Edition, McGraw Hill international edition, 1998.
3. Kai Hwang and Faye A Briggs, ”Computer Architecture and Parallel Processing”, McGraw Hill International edition,1995.

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

SCS1207	COMPUTER ARCHITECTURE AND ORGANISATION	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION **10 Hrs.**

Central Processing unit - Introduction - General Register Organization - Stack organization - Basic computer Organization - Instruction codes - Computer Registers - Computer Instructions - Instruction Cycle - Arithmetic – Logic - Shift Microoperations - Arithmetic Logic Shift unit - Example Architectures: MIPS – Power – PC – RISC - CISC

UNIT 2 DATA PATH DESIGN **10 Hrs.**

Computer arithmetic : Addition - Subtraction - Multiplication and Division algorithms - Floating Point Arithmetic operations Microprogrammed Control : Control memory - address sequencing - Microprogram Example - Design of Control unit - Example Processor design

UNIT 3 MEMORY ORGANISATION **8 Hrs.**

Memory Organization : Memory Hierarchy - Main memory - auxiliary Memory - Associative Memory - Cache Memory - Virtual memory

UNIT 4 IO ORGANISATION **9 Hrs.**

Input - Output Organization : Peripheral Devices - I/O Interface - Modes of transfer - Priority Interrupt - DMA - IOP - Serial Communication

UNIT 5 MULTIPROCESSORS **8 Hrs.**

Characteristics of multiprocessors - Interconnection Structures - Interprocessor Arbitration - Interprocessor Communication and Synchronization - Cache coherence.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Identify various types of registers, microinstructions and Instruction codes.
CO2 : Design the control unit of the Processor.
CO3 : Analyze various memory Organization.
CO4 : Describe about the peripheral devices, Interfaces, DMA and IOP.
CO5 : Comprehend the characteristics, structure, communication and synchronization of multiprocessor.
CO6 : Evaluate the communication and synchronization of interprocessor.

TEXT / REFERENCE BOOKS

1. M.Morris Mano, 'Computer system Architecture",Prentice-Hall Publishers,Third Edition.
2. John P Hayes , 'Computer architecture and Organization', McGraw Hill international edition, Third Edition.
3. Kai Hwang and Faye A Briggs ,'Computer Architecture and Parallel Processing', McGraw Hill international edition,1995.

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

SCSX1007	JAVA PROGRAMMING (Common to CSE, IT, E&C, BIOINFO & BIOMED)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION 10 hrs.

Classes and Objects – Class Fundamentals – Declaring Objects – Methods – Constructors – Garbage Collection - Inheritance – Basics – Using Super – Method Overriding – Abstract Classes – Using final with inheritance - String Handling – String class – String buffer class.

UNIT II PACKAGES AND INTERFACES 10 hrs.

Using Packages – Importing packages – Access protection – Interfaces – Exception Handling & I/O Streams – Exception Types – Using try, catch, throw, throws and finally – Byte and Character Streams – Multithreading – JavaThreadModel – Main thread – Creating muliple thread – Thread priorities – Synchronization.

UNIT III APPLET PROGRAMMING 10 hrs.

Java.lang package – Simple type wrappers – Runtime – System – Object – Class – Math thread – Using clone() and the Cloneable Interface – Applet Class – Applet basics – Applet architecture – HTML APPLET tag – Passing parameters to applets.

UNIT IV EVENT HANDLING 10 hrs.

Delegation Event Model – Handling Mouse and Keyboard Events – Adapter Classes – AWT – AWT Classes – Window Fundamentals – Graphics, Fonts – AWT Controls – Layout Managers – Menus – Dialog Boxes.

UNIT V NETWORKING 10 hrs.

Basics – Inet address – TCP/ IP – URL – UDP - Java beans and swings – Bean concepts - Events in bean box – Developing a simple Bean using BDK – Swing components.

TEXT / REFERENCE BOOKS:

1. Herbert Schildt, "The Complete Reference JAVA2", $^{t}5^{h}$ Edition, Tata McgrawHill, 2006.
2. Bruce Eckel, "Thinking in Java", Pearson Education, 2000.
3. Clayton Walnum, "Java By Example", QUE Publications, 2000.
4. Subrahmanyam Allamaraju and Cedric Buest, "Professional Java Server Programming", J2EE 1.3 Edition, APress, 2007.

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 80Marks

SIT4201	PROGRAMMING IN JAVA (50 Theory + 50 Laboratory)	L	T	P	Credits	Total Marks
		2	0	4	4	100

The course covers both theoretical and practical aspects. Marks split-up for the subject is 50% Theory and 50% Practical. Award of marks for Theory section is based on the Continuous Internal Assessments and for the Laboratory section practical examination will be conducted as per the regular University norms.

The following topics are to be covered for effective coverage of the course objective:

Class Fundamentals, Method Overriding, Inheritance, Packages, Exception Handling, Multithreading, Wrapper Classes, Input and Output Stream Classes, Byte and Character Stream Classes, Utility Packages, Applets, Swings, Database Connectivity, Regular Expressions, Networking, Java Beans

Max. 60 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Comprehend OOP's concepts, Java programming constructs, and Class Library with examples.
CO2 : Develop programs with Exception Handling & Multithreading Concepts.
CO3 : Implement Java Wrapper Classes and Stream Classes.
CO4 : Develop applications using Java Classes for Utility and Networking.
CO5 : Develop applications using Applet & Swings.
CO6 : Create Real time application using JDBC Connectivity.

TEXT / REFERENCE BOOKS

1. Herbert Schildt, "Java the Complete Reference", 9th Edition, McGraw Hill Education, 2014
2. http://docs.oracle.com/javase/tutorial/