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| **Course Code** | 21CSC206P | **Course Name** | ADVANCED OBJECT ORIENTED AND PROGRAMMING | **Course Category** | *C* | *Professional Core* | L | T | P | C |
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| **Pre-requisite Courses** |  | | **Co-requisite Courses** | *NIL* | | **Progressive Courses** |  |
| **Course Offering Department** | | *Data Science and Business Systems* | | | **Data Book / Codes/Standards** | *Nil* | |

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| **Course Learning Rationale (CLR):** | | | | *The purpose of learning this course is to:* |  |  | **Program Outcomes (PO)** | | | | | | | | | | | | | | |
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| **CLR-1 :** | Explore JAVA compiler and build domain model for real-time programs | | | |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **CLR-2 :** | Apply the OOP concepts in JAVA programs | | | |  |  | Engineering Knowledge | Problem Analysis | Design & Development | Analysis, Design, Research | Modern Tool Usage | Society & Culture | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | PSO - 1 | PSO - 2 | PSO – 3 |
| **CLR-3 :** | Utilize interfaces and packages in java applications | | | |  |  |
| **CLR-4 :** | Develop java applications using collection interface and ArrayLIst class with exception handling | | | |  |  |
| **CLR-5 :** | Design applications using Graphical User Interfaces and explore JDBC | | | |  |  |
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| **Course Outcomes (CO):** | | | *At the end of this course, learners will be able to:* | | |  |
| **CO-1 :** | Infer the concepts of Object-Oriented Programming with JAVA | | | | |  |  | *1* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO-2 :** | Construct programs using Class and Inheritance | | | | |  |  | *2* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO-3 :** | Create interface and package in java programs | | | | |  |  | *3* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO-4 :** | Apply collection interface and ArrayList class in programs and explore multithreading | | | | |  |  | *3* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO-5 :** | Design and build simple Graphical User Interfaces and execute queries to store and retrieve data in database | | | | |  |  | *3* |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| **Unit1:** Introduction to Java - Java programming Environment and Runtime Environment, Development Platforms -Standard, Enterprise. Java Virtual Machine (JVM), Java compiler, Bytecode, Java applet, Java Buzzwords, Java program structure, Comments, Garbage Collection, Lexical Issues.  Primitive Data types -Type Conversion and Casting, Variables, Arrays, Strings, Vector class.-Operators -Control Statements-- Selection Statements, Iteration Statements and Jump Statements.  **Tutorial** :   1. Simple JAVA program using control structures, arrays and Vector Class 2. Sum of series (1 + 2+ 3+…..n,1+1/2+1/3 +……..1/n,12 + 22+ 32 +…….n2) |
| **Unit-2** Object Oriented Programming in Java - Class Fundamentals, Declaring Objects, Object Reference, Introduction to Methods, Constructors, this Keyword, Method Overloading, Using Objects as Parameters, Returning Objects, Recursion, Access Control, Static Members, Final Variables, Inner Classes, Command Line Arguments, Variable Length Arguments. Inheritance - Super Class, Sub Class, The Keyword super, protected Members, Calling Order of Constructors, Method Overriding, the Object class, Abstract Classes and Methods, using final with Inheritance.  **Tutorial** :   1. Create Bank class with suitable methods to create objects as account holders 2. Program with static members and final variable |

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| **Unit-3** Packages and Interfaces - Defining Package, CLASSPATH, Access Protection, Importing Packages, Interfaces.  Exception Handling - Checked Exceptions, Unchecked Exceptions, try Block and catch Clause, Multiple catch clauses, Nested try Statements, throw, throws and finally Input/Output - I/O Basics, Reading Console Input, Writing Console Output, Print Writer Class, Object Streams and Serialization, Working with Files.  **Tutorial** :   1. Create and interface and implement it in a class 2. Create a package and import it in multiple classes |
| **Unit-4** Java Library - String Handling – String Constructors, String Length, Special String Operations -Character Extraction, String Comparison, Searching Strings, Modifying Strings, using valueOf(), Comparison of StringBuffer and String.  Collections framework - Collections overview, Collections Interfaces- Collection Interface, List Interface. Collections Class – ArrayList class. Accessing a Collection via an Iterator. Event handling - Event Handling Mechanisms, Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Model.  Multithreaded Programming - The Java Thread Model, The Main Thread, Creating Thread, Creating Multiple Threads, Synchronization, Suspending, Resuming and Stopping Threads.  **Tutorial** :   1. Programs using Collection Interface and ArrayList Class 2. Programs to implement event handling and exception handling |
| **Unit 5:** Swings fundamentals - Swing Key Features, Model View Controller (MVC), Swing Controls, Components and Containers, Swing Packages, Event Handling in Swings, Swing Layout Managers, Exploring Swings –JFrame, JLabel, The Swing Buttons, JTextField. Java Data Base Connectivity (JDBC) - JDBC overview, Creating and Executing Queries – create table, delete, insert, select.    **Tutorial** :   1. Form Design with Swing 2. Program with Java Data Base Connectivity (JDBC) 9 Hrs |

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| **Learning Resources** | 1. Herbert Schildt, Java: The Complete Reference, 8/e, Tata McGraw Hill, 2011. 2. Rajib Mall, Fundamentals of Software Engineering, 4th edition, PHI, 2014. 3. Paul Deitel, Harvey Deitel, Java How to Program, Early Objects 11th Edition, Pearson, 2018. | 1. Y. Daniel Liang, Introduction to Java Programming, 7/e, Pearson, 2013. 2. Nageswararao R., Core Java: An Integrated Approach, Dreamtech Press, 2008. |

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|  | Bloom’s Level of Thinking | **Continuous Learning Assessment (CLA) - By the Course Faculty** | | | | | | **By The CoE** | |
| CLA-1 Average of unit test (20%) | | CLA-2 Project Based Learning (60%) | | Report and Viva Voce  (20% Weightage) | | Final Examination  (0% weightage) | |
| Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 40 | - | - | *20* | - | *40* | - | - |
| Level 2 | Understand | 40 | - | - | *20* | - | *40* | - | - |
| Level 3 | Apply | 10 | - | - | *20* | - | *10* | - | - |
| Level 4 | Analyze | 10 | - | - | **20** | - | **10** | - | - |
| Level 5 | Evaluate |  | - | - | **10** | - | - | - | - |
| Level 6 | Create |  | - | - | **10** | - | - | - | - |
|  | Total | 100 % | | 100 % | | 100% | |  | |

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| **Course Designers** | | |
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| *Dr.Harisekharan, Praya AI Lab* |  | *Dr.Paul T Sheeba .AP/DSBS,SRMIST* |
|  |  | *Dr.T.Karthick, AP, DSBS, SRMIST* |