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| **Course Code: CSE2005** | | **Course Title Object Oriented Programming using JAVA** | | **TPC** | **3** | **2** | **4** |
| **Version No.** | | **4.1** | | | | | |
| **Course Pre-requisites/ Co- requisites** | | **CSE1022 – Introduction to Programming** | | | | | |
| **Anti-requisites (if any)** | | **CSE2015, SWE2005** | | | | | |
| **Objectives:** | | 1. To design the concepts of object-oriented, event driven, and concurrent programming paradigms and develop skills by using these paradigms in Java. 2. To analyze, design the principals of inheritance, dynamic polymorphism and interfaces. 3. To learn writing a computer program to solve specified problems. 4. To enable using the Java SDK environment to create, debug and run simple applications. | | | | | |
| **CO's Mapping with PO's and PEO's**   |  |  |  | | --- | --- | --- | | **Course Outcomes** | **Course Outcome Statement** | **PO's / PEO's** | | **CO1** | Design the structure of the Java programming language | PO1 / PEO4 | | **CO2** | Identify classes, objects, members of a class and relationships among them needed for a specific problem | PO1 / PEO4 | | **CO3** | Develop applications using packages, interfaces and also database connection | PO2, PO11 / PEO2 | | **CO4** | Develop Java programs to implement error handling techniques using exception handling | PO2, PO5 / PEO2 | | **CO5** | Develop applications using Object Oriented Programming principals and proper programming structure | PO3/ PEO3 | | **CO6** | Develop and understand multithreaded applications with synchronization | PO2, PO3, PO5 / PEO3 | | **TOTAL HOURS OF INSTRUCTIONS: 45** | | |   a | | | | | | | |
| **Module No. 1** | **Object-Oriented Programming – Fundamentals** | | | | **7 Hours** | | |
| Features of OOP – Data types, variables, Array, Operators, String function, Control statements, Objects and Classes in Java – Defining Classes – Methods - Access Specifiers – Static Members – Constructors, this Keyword-Encapsulation. | | | | | | | |
| **Module No. 2** | **Inheritance and Polymorphism** | | | | **8 Hours** | | |
| Inheritance: Inheritance Hierarchies, super keyword – final keyword-final classes and methods. Polymorphism: dynamic binding, method overriding. Abstraction-abstract classes and methods. The Object class –– Object Cloning– Inner Classes-Garbage Collection - Finalize Method. | | | | | | | |
| **Module No. 3** | **Packages and Interfaces** | | | | **8 Hours** | | |
| Packages and Interfaces -Interfaces - Interfaces vs. Abstract classes, defining an interface, implementing, Inner classes - uses of inner classes, local inner classes, anonymous inner classes, static inner classes. interfaces - extending interfaces. | | | | | | | |
| **Module No. 4** | **Exception Handling** | | | | **6 Hours** | | |
| Exceptions – Exception Hierarchy-Throwing and Catching Exceptions-Multiple Catch Clause-Nested Try statement- throw-throws-finally- Built in exceptions - User Defined Exceptions. | | | | | | | |
| **Module No. 5** | **The Collections Framework and Generic Programming** | | | | **9 Hours** | | |
| Collection, overview, Collection interface –List, Set, Map, Collection Classes- Array List, HashSet, HashMap- Using an Iterator- For-Each-Comparators, Wrapper classes. Motivation for Generic Programming – Generic Classes and Methods – Bounded Types –Wildcard Arguments –Generic Constructors and Interfaces. | | | | | | | |
| **Module No. 6** | **Concurrent Programming** | | | | **7 Hours** | | |
| Multi-Threaded Programming – Process Vs Thread - Thread Life Cycle - Thread class – Runnable interface- Thread Creation- Interrupting Threads – Thread States – Thread Properties –-Thread Control and Priorities - Inter Thread Communication -Thread Synchronization – Synchronization**.** | | | | | | | |
| **Text Books**  1.Herbert Schildt, “Java: The Complete Reference”, McGraw-Hill Education, Twelfth edition,2021. | | | | | | | |
| **References**   1. Kathy Sierra, Bert Bates, Trisha Gee, “Head First Java: A Brain-Friendly Guide”, Shroff Publishers & Distributor, Third Edition, June 2022. 2. Deitel “Java- How to Program:” Pearson Education, Asia, Eleventh edition 2018. 3. George Reese “Database Programming with JDBC & Java”, O'Reilly Media, Inc. ,Second Edition 2000 . | | | | | | | |
| **Lab Exercises**   1. Write a Java Program to demonstrate control statements. 2. Write a Java Program to implement array of objects. 3. Write a Java Program to demonstrate String and String function. 4. Write a Java Program to define a class, describe its constructor, overload the Constructors and instantiate its object 5. Write a Java Program to define a class, define instance methods for setting and Retrieving values of instance variables and instantiate its object 6. Write a Java Program to define a class, define instance methods and overload them and use them for dynamic method invocation 7. Write a Java Program to implement Wrapper classes and their methods. 8. Write a Java Program to implement inheritance and demonstrate use of method overriding. 9. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods. 10. Write a Java program to demonstrate use of implementing interfaces. 11. Write a Java program to implement the concept of importing classes from user defined package and creating packages 12. Write a program to implement the concept of threading by implementing Runnable Interface 13. Write a Java program to implement the concept of Exception Handling using predefined exception. 14. Write a Java program to implement the concept of Exception Handling by creating user defined exceptions. 15. Write a Java program using Collections 16. Write a Java Program using Generics 17. Write a Java Program to implement multi-threading. 18. Write a Java Program to implement Synchronization. 19. Write a Java Program to implement inter thread communication. 20. Write a java Program to demonstrate JDBC connection. | | | | | | | |
| **Course Type** | | | **Embedded Theory and Lab(ETL)** | | | | |
| **Mode of Evaluation** | | | **Theory 75%**  Continuous Assessment Test-1 15  Continuous Assessment Test-2 15  Digital Assignments/Quizzes 30  Final Assessment Test 40  **Laboratory 25%** | | | | |
| **Modified By** | | | **Dr. Prabha Selvaraj and Dr. Gopikrishnan S** | | | | |
| **Recommended by the Board of Studies on** | | | **14th BoS, 11.05.2024** | | | | |
| **Date of Approval by**  **the Academic Council** | | | **12th Academic Council, 25.05.2024** | | | | |