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| Course code | Programming in Java | L | T | P | J | C |
| CSI1013 | | 3 | 0 | 2 | 0 | 4 |
| Pre-requisite | Nil | Syllabus version | | | | |
| | | v.1.0 | | | | |
| Course Objectives: | | | | | | |
| 1. Understand Object Oriented Programming & Functional Programming in Java, Handling Exceptions and Multithreading. | | | | | | |
| 2. Able to perform File Handling, Manipulating Strings, Generic Programming. | | | | | | |
| 3. Use of Java for Event Handling and Web applications using Servlets. | | | | | | |
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| Expected Course Outcome: | | | | | | |
| At the end of this course students should be able to: | | | | | | |
| 1. Analyze the programs involving the fundamental program constructs. | | | | | | |
| 2. Choose the appropriate OOP technique for solving the real world problem. | | | | | | |
| 3. Demonstrate exception handling and use of threads in Java. | | | | | | |
| 4. Propose the use of Generic programming and file handling for different scenarios. | | | | | | |
| 5. Explore various methods for manipulating strings and several collections. | | | | | | |
| 6. Choose appropriate elements to facilitate event handling and GUI programming. | | | | | | |
| 7. Design and develop web applications using Servlets with JDBC. | | | | | | |
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| Student Learning Outcomes (SLO): 1, 9, 14 | | | | | | |
| 1. Having an ability to apply mathematics and science in engineering applications | | | | | | |
| 9. Having problem solving ability, solving social issues and engineering problems | | | | | | |
| 14. Having an ability to design and conduct experiments, as well as to analyze and interpret data | | | | | | |
| Module:1 | Introduction to Java Programming | 4 hours | | | | |
| Overview of Java Language: Introduction, Java Virtual Machine, program structure, Java tokens, statements, variables, scope of variables and data types. Arrays: One-Dimensional arrays, Multidimensional Arrays. | | | | | | |
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| Module:2 | Object, Class and Packages | 7 hours | | | | |
| Object Oriented Programming and Java –. Classes – Objects – Methods – Constructors – this keyword – Garbage collection – Overloading methods – Objects as parameters and returning objects – Nested and Inner classes – static and final keywords – Inheritance: Basics, Using super, Class hierarchy, Method overriding, Abstract classes – The Object Class – Packages and Interfaces. | | | | | | |
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| Module:3 | Exceptions and Threads | 7 hours | | | | |
| Exception Handling: Fundamentals, Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try, Built-in Exceptions, Creating your own exception subclasses. | | | | | | |
| Threads: Java thread model, Main thread, Creating a thread, Creating multiple threads, Thread priorities, Synchronization, Inter thread communication, Thread's states, Multithreading. | | | | | | |
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| Module:4 | Files and Generics | 6 hours | | | | |
| I/O streams – Console I/O – The PrintWriter class – Reading and Writing files. Generics: Basics, A Generic class, General form, Using wildcard arguments, Generic methods, Generic Interfaces, Generic Class hierarchy, Type inference. | | | | | | |
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| Module:5 | Lambda Expressions and Strings | 6 hours | | | | |

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| Lambda Expressions: Introduction, Block Lambda expressions, Passing Lambda expressions as arguments, Lambda Expressions and Exceptions. String Handling: The String Constructors, Various String Operations, StringBuffer and StringBuilder Classes. | | |
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| Module:6 | Java Event Handling and GUI Programming | 6 hours |
| Event Handling mechanism, Event Delegation, Event and KeyEvent Classes, EventListener Interfaces. GUI Programming with JavaFX: UI Controls, Layout Classes, Collection Classes, Media Classes. | | |
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| Module:7 | Java Servlets and JDBC | 7 hours |
| Background - Lifecycle of a servlet – Development – The Servlet API – The javax.servlet package – Reading Servlet Parameters - Handling http requests and responses – Using Cookies – Session Tracking – JDBC-Servlets with JDBC | | |
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| Module:8 | Recent Trends | 2 hours |
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| | Total Lecture hours: | 45 hours |
| Text Book(s) | | |
| 1. | Herbert Schildt, “Java: The Complete Reference”, , 11 th Edition., McGraw-Hill Publishers December 2018. | |
| 2. | Cay S. Horstmann, “Core Java Volume I--Fundamentals”, 11 th Edition. , Pearson Publishers. August 2018. | |
| Reference Books | | |
| 1. | Ben Evans, David Flanagan, “Java in a Nutshell 7 th Edition., O'Reilly Media, Inc. December 2018. | |
| 2. | Joshua Bloch, “Effective Java”.., 3 rd Edition. Addison Wesley Publishers December 2018 | |
| Mode of Evaluation: CAT / Assignment / Quiz / FAT / Project / Seminar | | |
| List of Experiments | | |
| 1. | Programs to demonstrate the use of arrays and various OOP concepts. | 2 hours |
| 2. | Programs to understand various exceptions and handling them. | 2 hours |
| 3. | Programs to demonstrate the concept of threads and multithreading in Java | 2 hours |
| 4. | Programs to understand Generic Programming technique and Lambda expressions. | 4 hours |
| 5. | Programs to create and manipulate file using different I/O methods. | 4 hours |
| 6. | Programs to explore various string handling methods. | 3 hours |
| 7. | Programs to idealize the use of different collection frameworks in java.util package and use of java.lang packages. | 3 hours |
| 8. | Programs to explore various swing elements to deepen the understanding of javaFX | 3 hours |
| 9. | Programs to realize the power of Java for internet programming through servlets. | 3 hours |
| 10. | Programs to realize the power of Java for internet programming through servlets with JDBC | 4 hours |
| Total Laboratory Hours | | 30 hours |
| Mode of evaluation: CAT / Assignment / Quiz / FAT | | |
| Recommended by Board of Studies | | 11-02-2021 |

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| Approved by Academic Council | No. 61 | Date | 18.02.2021 |
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