# Course Description

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| --- | --- |
| Semester: II | Course Title: Object Oriented Programming Using Java |
| Course Code: | Course Type: DSC |
| Course Credits:3 | Intended Level :Certificate |
| Total Hours | 45 |
| Cross cutting Issue(s) Addressed | Human Values / Gender Rights / Professional Ethics / Environmental Sustainability |
| Need(s) catered by the  Course | Local / National / Regional / Global |
| Course offered to | BSC (Data Science) |

1. **Course Objectives** 
   * To inculcate knowledge on the architecture-neutral nature of Java and the concepts of Object-Oriented programming.
   * To demonstrate skills in writing programs using exception handling techniques and multithreading.

# Course Outcomes

After the successful completion of the course the student will be able to:

CO1: understand the basic object-oriented concepts in java programming.

CO2: design and analyze reusable programs using the concepts of inheritance, interfaces and

packages

C03: identify and design the concepts of multithreading and exception handling to develop

efficient and error free codes

CO4: summarize the concept of event driven GUI and create applications using AWT concepts.

CO5: demonstrate a client server architecture using RMI.

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| --- | --- | --- | --- | --- | --- | --- |
| Course  Outcomes | Mapping | | | | | |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| CO1 |  | ✓ |  | ✓ |  |  |
| CO2 |  |  | ✓ | ✓ | ✓ | ✓ |
| CO3 | ✓ |  | ✓ | ✓ | ✓ | ✓ |
| CO4 |  | ✓ |  | ✓ | ✓ | ✓ |
| CO5 | ✓ |  |  | ✓ |  | ✓ |

1. **Course Articulation Matrix**: Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

# Course Content

|  |  |
| --- | --- |
| **Content** | **Hours** |
| **Unit 1:** **Introduction and Features of Java**  Object-oriented programming-definition, building blocks of OOP-classes, objects, methods, attributes; Principles of OOPs- inheritance, encapsulation, abstraction ,polymorphism –compile time, runtime ; benefits and limitations of OOP; features of java, Java development kit -JDK; Java interpreter, Java virtual machine, basics of Java programming- data types, variables, operators, control structures - selection, looping, arrays in java.  Classes – fundamentals, methods, declaring objects, access specifiers, constructors, command line arguments, this, final, static, finalize, method overloading, string handling | 10 |
| **Unit 2**: **Inheritance Packages and Interfaces**  **Inheritance** – types of inheritance, method overriding - dynamic method dispatch; abstract classes, usage of super.  **Interfaces**- defining an interface, implementing interfaces, extending interfaces.  **Package** - define package, CLASS PATH, access protection, importing packages; lang Package - Wrapper classes. | 10 |
| **Unit 3**: **Exception Handling and Multithreading**  **Exception Handling** - fundamental of exception, exception types, using try and catch, multiple catch, nested try, throw, finally, built-in exception, user defined exception.  **Multithreading**-thread fundamentals, priorities, creating thread using thread class and runnable interface | 9 |
| **Unit 4**: **Event Handling and I/O Programming**  **Event Handling** – Event handling mechanisms, delegation event model, event classes, sources of events, event listener interfaces, handling mouse and keyboard events.  **AWT**-AWT classes, working with frame windows, AWT Controls.  **I/O programming**: text and binary I/O, binary I/O classes, object I/O. | 8 |
| **Unit 5**: **Remote Method Invocation**  Introduction to Client-Server architecture, RMI concepts, stubs and skeleton, java RMI classes and interfaces, writing simple RMI application, parameter passing in remote methods- Marshalling and unmarshalling | 8 |

1. **Resources**
2. Reference Books

Balagurusamy. E. (2020) *Programming with JAVA A Primer*, New Delhi: Tata McGraw- Hill Publishing Company Limited.

Herbert Schildt. (2020)*The Complete Reference- Java*, 11th edition, New Delhi: Tata McGraw-Hill Publishing Company Limited.

Daniel Liang Y. (2010) *Introduction to JAVA Programming*, 6th edition, Pearson Education.

Debasish Jana. (2005) *Java and Object-Oriented Programming Paradigm*, PHI.

John Hubbard R. (2004) *Programming With Java*, 2nd edition, TMH.

1. Online Resources

* NPTEL
* Swayam
* MOOC
* www.tutorialspoint.com, etc

1. In-house Electronic Resources and Databases ( KJLMS / J-RISE / Storage Devices )

* KJLMS
* J-RISE

# Pedagogy

* Lecture
* Hands on /Debugging
* Tracing the program
* Implementing concepts in micro level projects

# Skill set Identification Matrix

|  |  |  |  |
| --- | --- | --- | --- |
| **COs** | **Level of Bloom’sTaxonomy** | **Expected SkillOutcome(s)** | **Assessment (Formative and Summative)** |
| CO1 | L1,L2,L5 (remembering,  understanding, Evaluating) | Conceptual and evaluating  skill | Both Formative and Summative |
| CO2 | L2, L4, L6 (understanding,  Analysis and Design) | Design and analyzing skill | Both Formative and Summative |
| CO3 | L1,L2,L6 (remembering,  understanding, Create) | Implement the programming  skill | Both Formative and Summative |
| CO4 | L1,L2,L6 (remembering,  understanding, create) | Error identification skill | Both Formative and Summative |
| CO5 | L2,L5,L6 (Understanding,  Evaluate, create) | Application development  skill | Both Formative and Summative |

# Course Assessment Plan

1. **Weightage of Marks in Formative and Summative Assessments**

|  |  |  |
| --- | --- | --- |
| **COs** | **Formative Assessment -**  **FA ( 25%)** | **Summative Assessment – SA (45%)** |
| CO1 | 8 | 13 |
| CO2 | 7 | 10 |
| C03 | 7 | 10 |
| C04 | 1 | 6 |
| CO5 | 2 | 6 |

# Question Paper Pattern

# Midterm Examination I–

Maximum Marks : 30 marks scaled down to 15 marks Duration : 75 minutes

Section A: 5 out of 7 questions – 2 marks each = 10 marks Section B: 4 out of 6 questions – 5 marks each = 20 marks

**Online Midterm Examination II -** 5 questions, each carries 01 mark= 5 marks

**End Semester Examination:**

Maximum Marks : 45 Duration : 2 Hours

Section A: 5 out of 8 questions, each carrying 2 marks = 10 marks. (5x2=10 marks) Section B: 3 out of 6 questions – 5 marks each = 15 marks (3x5=15 Marks) Section C: 2 out 4 questions – 10 marks each = 20 marks (2x10=20 Marks)

1. **Question Paper Blue Print**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit** | **Hours Allotted**  **in the Syllabus** | **COs Addresse d** | **No. of Questions & Marks Distribution** | | | | | |
| **Section A** | **Total Marks** | **Section B** | **Total Marks** | **Section C** | **Total Marks** |
| I | 10 | CO1 | 2 | 4 | 2 |  | 1 |  |
| II | 10 | CO2 | 2 | 4 | 1 |  | 1 |  |
| III | 9 | CO3 | 2 | 4 | 1 |  | 1 |  |
| IV | 8 | CO4 | 1 | 2 | 1 |  | 1 | 5 |
| V | 8 | CO5 | 1 | 2 | 1 |  | 5 |
| **Bloom’s Taxonomy Level(s) Used** | | | Remembering, Understanding Levels | | Applying, Analyzing  Evaluating and Creating Levels | | Applying, Analyzing,  Evaluating and Creating Levels | |

# Mapping COs using Rubrics

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Quest ion**  **numb er** | **Mapping** | | | | | | | | | | | | | | |
| **MTE I** | | | |  |  | **MTE II** | | | | **ESE** | | | | |
| **CO 1** | **CO 2** | **CO 3** | **C O4** | **C O5** | **CO 1** | **CO 2** | **CO 3** | **C O4** | **C O5** | **C O1** | **CO 2** | **C O3** | **CO 4** | **CO 5** |
| Q1 | ✓ |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |  |  |
| Q2 | ✓ |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |  |  |
| Q3 | ✓ |  |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |  |
| Q4 |  | ✓ |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |  |
| Q5 |  | ✓ |  |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |
| Q6 |  |  | ✓ |  |  |  |  | ✓ |  |  |  |  | ✓ |  |  |
| Q7 |  |  | ✓ |  |  |  |  |  | ✓ |  |  |  |  | ✓ |  |
| Q8 | ✓ |  |  |  |  |  |  |  | ✓ |  |  |  |  |  | ✓ |
| Q9 | ✓ |  |  |  |  |  |  |  |  | ✓ | ✓ |  |  |  |  |
| Q10 |  | ✓ |  |  |  |  |  |  |  | ✓ | ✓ |  |  |  |  |
| Q11 |  | ✓ |  |  |  |  |  |  |  |  |  | ✓ |  |  |  |
| Q12 |  |  | ✓ |  |  |  |  |  |  |  |  |  | ✓ |  |  |
| Q13 |  |  | ✓ |  |  |  |  |  |  |  |  |  |  | ✓ |  |
| Q14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |
| Q15 |  |  |  |  |  |  |  |  |  |  | ✓ |  |  |  |  |
| Q16 |  |  |  |  |  |  |  |  |  |  |  | ✓ |  |  |  |
| Q17 |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |  |  |
| Q18(a) |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |  |
| Q18(b) |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ✓ |

1. **Mapping FA Components using Rubrics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **FA Component** | **Mapping** | | | | |
| **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Assignment** |  |  |  |  |  |
| **Seminar** |  |  |  |  |  |
| **Activity Based Learning** |  |  |  |  |  |
| **Any Other (Specify):** |  |  |  |  |  |

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| **Prepared by Course Teacher**  [Name & Signature] | **Checked &** **Verified by**  **HoD / Programme Coordinator**  [Name & Signature] | **Approved by the Dean** |
| **Ms.MaryJacob**  **Ms.Divya**  **Dr.Jasmin** | **Mr. SevugaPandian** | **Dr. Calistus Jude AL** |