

ADVANCED JAVA		Semester	IV
Course Code	<b>BIS402</b>	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	
Examination nature (SEE)	Theory/		

**Note- Students who have not opted for Java course in earlier semester, student has to undergo a bridge course on basics of java before the commencement of 4th sem**

**Course objectives:**

- CLO 1. Understanding the fundamentals of collection framework
- CLO 2. Demonstrate the fundamental concepts of String operations and Swing applications
- CLO 3. Design and develop web applications using Java servlets and JSP
- CLO 4. Apply database interaction through Java database Connectivity

**Teaching-Learning Process (General Instructions)**

These are sample Strategies; that teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but different types of teaching methods may be adopted to achieve the outcomes.
2. Promote collaborative learning (Group Learning) in the class.
3. Pose at least three HOT (Higher Order Thinking) questions in the class to stimulate critical thinking.
4. Incorporate Problem-Based Learning (PBL) to foster students' analytical skills and develop their ability to evaluate, generalize, and analyze information rather than merely recalling it.
5. Introduce Topics in manifold representations.
6. Demonstrate ways to solve the same problem and encourage the students to come up with their own creative solutions.
7. Discuss application of every concept to solve the real world problems.

**MODULE-1**

**The collections and Framework:** Collections Overview, The Collection Interfaces, The Collection Classes, Accessing a collection Via an Iterator, Storing User Defined Classes in Collections, The Random Access Interface, Working With Maps, Comparators, The Collection Algorithms, Arrays,, The legacy Classes and Interfaces, Parting Thoughts on Collections.

**Text Book 1:** Ch. 20

**MODULE-2**

**String Handling :**The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using valueOf( ), Changing the Case of Characters Within a String, joining strings, Additional String Methods, StringBuffer , StringBuilder

**Text Book 1:** Ch 18

**MODULE-3**

**Introducing Swing:** The Origin of Swing, Swing Is Built on AWT, Two Key Swing Features, The MVC Connection, Components and Containers, The Swing Packages, A Simple Swing Application, Event Handling, Painting in Swing,  
**Exploring Swing :** JLabel and ImageIcon, JtextField, The Swing Buttons-JButton, JToggleButton, Check Boxes, Radio Buttons

**Text Book 1:** Ch 32 and Ch. 33

#### **MODULE-4**

**Introducing servlets:** Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The Jakarta. Servlet Package; Reading Servlet Parameter; The Jakarta.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking. Java Server Pages (JSP); JSP tags, Variables and Objects, Methods, Control statements, Loops, Request String, Parsing other information, User sessions, Cookies, Session Objects.

**Text Book 1:** Ch 36

**Text Book 2:** Ch 11

#### **MODULE-5**

**JDBC Objects:** The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet; Transaction Processing; Metadata, Data types; Exceptions.

**Text Book 2:** Ch 06

**PRACTICAL COMPONENT OF IPCC***(May cover all / major modules)*

Sl.N O	Experiments
1	Implement a java program to demonstrate creating an ArrayList, adding elements, removing elements, sorting elements of ArrayList. Also illustrate the use of toArray() method.
2	Develop a program to read random numbers between a given range that are multiples of 2 and 5, sort the numbers according to tens place using comparator.
3	Implement a java program to illustrate storing user defined classes in collection.
4	Implement a java program to illustrate the use of different types of string class constructors.
5	Implement a java program to illustrate the use of different types of character extraction, string comparison, string search and string modification methods.
6	Implement a java program to illustrate the use of different types of StringBuffer methods
7	Demonstrate a swing event handling application that creates 2 buttons Alpha and Beta and displays the text “Alpha pressed” when alpha button is clicked and “Beta pressed” when beta button is clicked.
8	A program to display greeting message on the browser “Hello UserName”, “How Are You?”, accept username from the client using servlet.
9	A servlet program to display the name, USN, and total marks by accepting student detail
10	A Java program to create and read the cookie for the given cookie name as “EMPID” and its value as “AN2356”.
11	Write a JAVA Program to insert data into Student DATA BASE and retrieve info based on particular queries(For example update, delete, search etc...).
12	A program to design the Login page and validating the USER_ID and PASSWORD using JSP and DataBase.

**Course outcomes (Course Skill Set):**

At the end of the course, the student will be able to:

CO 1. Apply appropriate collection class/interface to solve the given problem

CO 2. Demonstrate the concepts of String operations in Java

CO 3. Apply the concepts of Swings to build Java applications

CO 4. Develop web based applications using Java servlets and JSP

CO 5. Use JDBC to build database applications

**Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**CIE for the theory component of the IPCC (maximum marks 50)**

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests,

each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

#### **CIE for the practical component of the IPCC**

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

#### **SEE for IPCC**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

**The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.**

#### **Suggested Learning Resources:**

##### **Books**

1. Y. Daniel Liang: Introduction to JAVA Programming, 7<sup>th</sup> Edition, Pearson Education, 2007.
2. Stephanie Bodoff et al: The J2EE Tutorial, 2<sup>nd</sup> Edition, Pearson Education, 2004.
3. Uttam K Roy, Advanced JAVA programming, Oxford University press, 2015.

#### **Web links and Video Lectures (e-Resources):**

1. <https://nptel.ac.in/courses/106/105/106105191/>
2. <https://nptel.ac.in/courses/106/105/106105225/>
3. <https://youtu.be/qGMxs-PbFPk>

#### **Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

Demonstration of simple projects on database connectivity

Group assignment for J2EE projects