

# **SEMESTER IV**

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4101</b>	<b>Lecture: 04 Credit: 04</b>
<b>Course Opted</b>	<b>Core Course - 11</b>
<b>Subject Title</b>	<b>ADVANCED JAVA</b>

**Course Objectives:**

- Development of GUI programs using Swing
- Use power of advance Java for building Applications using Database connectivity

**Course Outcomes:**

- Developing GUI based applications
- Database Connectivity
- Advanced Java such as Servlets, JSP and Java Beans

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT - I	1	<b>Introduction to Swing:</b> Introduction to JFC and Swing, Features of the Java Foundation Classes Swing API Components, J Component Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes	4	15
	2	<b>Swing Component Basic:</b> Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees Printing with 2D API and Java Print Service API	4	15
UNIT - II	3	<b>Swing Component Basic:</b> List, comboBox, Spinners, Swing containers, Root Pane, JFrame class, JWindow class, JApplet class, Internal Frames	4	10
	4	<b>JDBC Connectivity :</b> JDBC Introduction, JDBC Architecture, Types of JDBC Drivers, The Connectivity Model, The java.sql package, Navigating the ResultSet object's contents, Manipulating records of a ResultSet object through User Interface ,	8	15
UNIT - III	5	The JDBC Exception classes, Database Connectivity, Data Manipulation (using Prepared Statements, Joins, Transactions, Stored Procedures), Data navigation	6	10
	6	<b>Servlet:</b> What Is a Servlet? The Example Servlets, Servlet Life Cycle, Sharing Information, Initializing a Servlet, Writing Service Methods, Filtering Requests and Responses, Invoking Other Web Resources, Accessing the Web Context, Maintaining Client State, Finalizing a Servlet.	8	15

UNIT - IV	7	<b>Java Server Pages (JSP):</b> What Is a JSP Page?, The Example JSP Pages, The Life Cycle of a JSP Page, Creating Static Content, Creating Dynamic Content	8	10
	8	<b>JAVA Beans:</b> JavaBeans Components, JavaBeans Concepts, Using NetBeans GUI Builder Writing a Simple Bean, Properties: Simple Properties, Using Custom tags, 2 Reusing content in JSP Pages, Transferring Control to Another Web Component, Including an Applet.	8	10
<b>TOTAL</b>			<b>50</b>	<b>100</b>

**Text Book:**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education

**Reference Books:**

1. Thinking in Java, Bruce Eckel, Pearson Education.
2. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
3. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4201</b>	<b>Lecture: 02</b> <b>Credit: 02</b>
<b>Course Opted</b>	<b>Core Course - 11</b>
<b>Subject Title</b>	<b>ADVANCED JAVA LAB</b>

**Course Objectives:**

- To write programs using swing.
- To write programs for solving real world problems using java collection frame work.
- To write servlet and JSP programs.
- To write GUI programs using swing controls in Java.
- To impart hands on experience with java programming.

**Course Outcomes:**

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using swing, JSP, JDBC and Servlet.
- Able to write GUI programs using swing controls in Java.

<b>Module</b>	<b>Sr. No.</b>	<b>Topic and Details</b>	<b>No. of Lectures Assigned</b>	<b>Marks Weightage %</b>
UNIT - I	1	<b>Introduction to Swing:</b> Introduction to Swing, Container Class, GUI in JAVA, GUI Examples	2	4
UNIT - II	2	<b>Swing Component Basic:</b> Java Layout Manager, Java BorderLayout Java FlowLayout, Java GridBagLayout Implentation of Menus, GUI Designing using Menus, API	2	4
	3	<b>Swing Component Basic:</b> Implementation of swing component List, comboBox, Spinners, Swing containers, Root Pane, JFrame class, JWindow class, JApplet class, Internal Frames	2	4
UNIT - III	4	<b>JDBC Connectivity :</b> JDBC-ODBC Bridge Driver, Native Driver, Network Protocol Driver, and Thin Driver JDBC Environment should set-up along with database creation.	4	8
	5	Connectivity with SQL, JDBC ResultSet, Execute read select query, update records and execute query	4	8

UNIT -IV	6	<b>Servlet:</b> Servlet programming, Database Connectivity, class method, create an object in Java Servlet program Get the data from the HTML file	4	8
	7	<b>Java Server Pages (JSP):</b> Basic JSP Programs for addition, Factorial, Fibonacci, Display current date and time	4	8
	8	<b>JAVA Beans:</b> Implementation of JAVA Bean class, Setter and getters methods in JAVA Bean	3	6
<b>TOTAL</b>			<b>25</b>	<b>100</b>

**Text Book:**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education

**Reference Books:**

1. Thinking in Java, Bruce Eckel, Pearson Education.
2. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
3. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4102</b>	<b>Lecture: 04</b> <b>Credit: 04</b>
<b>Course Opted</b>	<b>Core Course - 12</b>
<b>Subject Title</b>	<b>PYTHON PROGRAMMING</b>

**Course Objectives:**

- To understand the fundamentals of Python Scripting language
- Learn basic components of Python such as variables, looping and conditional flow controls
- Understand the working of list, tuples and dictionary data types
- Learn python file operations for file handling
- Learn the creating GUI form and designing of GUI applications

**Course Outcomes:**

- To understand importance of Python scripting language for developers and Data Scientists.
- To learn to install Python IDE, start the Python shell
- To define and implement components of a Python program.
- To learn how to use lists, tuples, and dictionaries in Python programs
- To learn how to use functions
- To implement GUI application and layout management

<b>Modules</b>	<b>Sr. No.</b>	<b>Topic and Details</b>	<b>No. of Lectures Assigned</b>	<b>Marks Weightage %</b>
UNIT - I	1	<b>Introduction to Python and Basic Concepts in python</b> Introduction to python: What is python? Applications of Python, Why Python? Installation of python, First program in Python, Comments and Docstrings in Python	4	8
	2	<b>Python variables and Data Types:</b> Declaring and using Numeric data types: int, float, complex, Using string data type and string operations. Accessing strings, Basic operations, String slices, Functions and methods Operators in python	4	8
UNIT - II	3	<b>Python Program Flow Control</b> Conditional Statements: Indentation in python, Conditional blocks using if, else and elif, Looping statement: Simple for loops in python, For loop using ranges, string, list and dictionaries, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block	8	16
	4	<b>Python collection: List, Tuple, set and dictionary</b> <b>List:</b> Introduction, Accessing lists, change item value in list, loop through list, methods <b>Tuple:</b> Introduction, Accessing tuples, change item value in tuple , loop through tuple and methods of tuple <b>Set:</b> introduction and methods of set <b>Dictionary:</b> Introduction, Accessing values in dictionaries, properties, Change	10	20

		value in dictionary, loop through dictionary and methods of dictionary.		
UNIT - III	5	Functions, Data visualization in python Functions: Defining a function, Calling a function, Function arguments, Default parameter value, Anonymous function: Lambda function(why use lambda, syntax and examples of lambda). Data visualization in python: Pandas packages (NumPy and matplotlib libraries)	10	20
	6	<b>File Handling: working with open, read, write, append modes of file</b> Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines()	5	8
UNIT - IV	7	<b>Creating the GUI Form and Adding Widgets:</b> Widgets: Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel, spinbox, PanedWindow, LabelFrame, tkMessageBox. Handling Standard attributes and Properties of Widgets.	5	12
	8	<b>Layout Management:</b> Designing GUI applications with proper Layout Management features.	4	8
<b>TOTAL</b>			<b>50</b>	<b>100</b>

**Text Book:**

1. Learning With Python, by Allen Downey, Jeff Elkner and Chris Meyers

**Reference Books:**

1. Dive into Python, Mike
2. Learning Python, 4th Edition by Mark Lutz
3. Programming Python, 4th Edition by Mark Lutz
4. Python Cookbook, Third edition by David Beazley and Brian K. Jones
5. Head First Python: A Brain-Friendly Guide, by Paul Barry
6. Learn Python The Hard Way, by Zed A. Shaw
7. Learning Python the hard way by show zed, Pearson 3rd Edition

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4202</b>	<b>Lecture: 02</b> <b>Credit: 02</b>
<b>Course Opted</b>	<b>Core Course - 12</b>
<b>Subject Title</b>	<b>PYTHON PROGRAMMING LAB</b>

**Course objectives:**

- To learn Installation of Python interpreter
- To understand python basic syntax and data types
- To implement variable declarations in Python
- To use control structures
- To learn modules

**Course Outcomes:**

- Able to use the fundamental Python syntax.
- Able to handle strings and functions.
- Able to write programs using control and conditional structure
- Able to create and run Python programs by utilizing the data structures like lists,
- Able to use dictionaries, tuples and sets.

<b>Modules</b>	<b>Sr.No.</b>	<b>Topic and Details</b>	<b>No. of Lectures/ Practical Assigned</b>	<b>Marks Weightage %</b>
UNIT - I	1	<b>Installation of Python</b> <b>Implementation of Data Types:</b> Numeric int, float, complex data types and type conversions Implementation of string data type, list, data type Conversions, Use of Built in Functions.	4	8
UNIT - II	2	<b>Python Program Flow Control</b> Programs to Implement if, else and elif, loops, Loop manipulation using pass, continue, break and else and loops block	5	10
UNIT - III	3	<b>Functions, Data visualization in python</b> Programs using functions, modules and external packages Programs to implement file operations	8	16
UNIT - IV	4	<b>Creating the GUI Form and Adding Widgets:</b> Creation of GUI Form and Adding Widgets: Designing GUI applications with proper Layout Management features	8	16
<b>TOTAL</b>			<b>25</b>	<b>50</b>

**Text Book:**

1. Learning With Python, by Allen Downey, Jeff Elkner and Chris Meyers



**Reference Book:**

1. Dive into Python, Mike
2. Learning Python, 4th Edition by Mark Lutz
3. Programming Python, 4th Edition by Mark Lutz
4. Python Cookbook, Third edition by David Beazley and Brian K. Jones
5. Head First Python: A Brain-Friendly Guide, by Paul Barry
6. Learn Python The Hard Way, by Zed A. Shaw
7. Learning Python the hard way by show zed, Pearson 3rd Edition

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4103</b>	<b>Lecture: 04</b> <b>Credit: 04</b>
<b>Course Opted</b>	<b>Core Course - 13</b>
<b>Subject Title</b>	<b>DATA WAREHOUSING AND DATA MINING</b>

**Course Objectives:**

- Understand the necessity of Data Warehousing and its continuous growth.
- Understand Planning and Management of Data Warehouse.
- Understand issues in various Architectural types of Data warehouse.
- Understand the application of various models of Data Warehouse.
- Understand the web-enabled data warehouse and role of data mining

**Course Outcomes:**

On completion of the course the student will be able to

- Decide the type of Data warehouse to build.
- Perform Requirement gathering and Design suitable architecture for Data warehouse project.
- Design and prepare data for Data warehouse using ETL tools
- Build web-enabled data warehouse
- Analyze and Apply Data Mining techniques on real life applications
- Demonstrate phases in data warehouse development life cycle with Data warehouse project.

<b>Modules</b>	<b>Sr. No.</b>	<b>Topic and Details</b>	<b>No of Lectures Assigned</b>	<b>Marks Weightage %</b>
<b>UNIT - I</b>	1	<b>Introduction to Data Mining:</b> Basic Data Mining Tasks, DM versus Knowledge Discovery in Databases, Data Mining Issues, Data Mining Metrics, Social Implications of Data Mining, Overview of Applications of Data Mining	4	8
	2	<b>Data ware housing building blocks:</b> Data ware house and Data Marts, Architecture of DW, Components, Metadata, OLAP and Data Cubes	4	8
	3	<b>Data Warehousing Concept:</b> Dimensional Data Modeling-star, snowflake schemas, Data Preprocessing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction, Machine Learning, Pattern Matching	4	8
		<b>Data Mining Techniques:</b> Frequent item-sets and Association rule mining: Apriori algorithm, Use of sampling for frequent item-set, FP tree algorithm, Graph Mining: Frequent sub-graph mining, Tree mining	4	10

		Sequence Mining		
UNIT - II	5	<b>Classification &amp; Prediction</b> Decision tree learning: Construction, performance, attribute selection, Issues: Over-fitting, tree pruning methods, missing values, continuous classes, Classification and Regression Trees (CART) Bayesian Classification: Bayes Theorem, Naïve Bayes classifier, Bayesian Networks, Inference, - Parameter and structure learning, -Linear classifiers, -Least squares, logistic, perceptron and SVM classifiers, Prediction, -Linear regression, - Non-linear regression	10	24
UNIT - III	6	<b>Accuracy Measures:</b> Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap	4	6
	7	<b>Software for data mining and applications of data mining :</b> R, Weka, Sample applications of data mining	6	8
	8	<b>Clustering:</b> k-means, Expectation Maximization (EM) algorithm, Hierarchical clustering, Correlation clustering	4	8
UNIT - IV	9	<b>Brief overview of advanced techniques:</b> Active learning, Reinforcement learning, Text mining, Graphical models, Web Mining	4	8
	10	<b>Case Studies:</b> Discuss test cases for data warehouse applications, Discovering web access patterns and trends by Data Mining Technology on Web Logs, Discovering web access patterns and trends by applying OLAP, Discuss design of data warehouse/ Data Mart for suitable system	6	12
<b>TOTAL</b>			<b>50</b>	<b>100</b>

**Text Book:**

1. Data Mining and Data Warehousing: Principles and Practical Techniques , by Parteek Bhatia.(2019)

**Reference Books:**

1. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Jian Pei.(2012)
2. Data Mining – Introductory and Advanced Topics, Pearson Education, Margaret H. Dunham, S. Sridhar(2020).
3. Christopher M. Bishop, —Pattern Recognition and Machine Learning, Springer

4. Ian H.Witten, Eibe Frank Data Mining: Practical Machine Learning Tools and Techniques, Elsevier/(Morgan Kaufman), ISBN:9789380501864(2011)
- 5.Hands on Programming with R,Oreilly,Garrett Golemund by Hadley Wickham.(2014)

**Web References:**

1. <https://www.cs.waikato.ac.nz/ml/weka>
2. <https://nptel.ac.in/courses/111/104/111104120/>

<b>Branch: B.Sc.(IT)</b>	<b>Semester-IV</b>
<b>Subject Code: 4104</b>	<b>Lecture: 04</b> <b>Credit: 04</b>
<b>Course Opted</b>	<b>Core Course – 14</b>
<b>Subject Title</b>	<b>SOFTWARE ENGINEERING</b>

**Course Objectives:**

- To learn and understand the principles of Software Engineering
- To be acquainted with methods of capturing, specifying, visualizing and analyzing software requirements.
- To apply Design and Testing principles to S/W project development.
- To understand project management through life cycle of the project.
- To understand software quality attributes.

**Course Outcomes:**

- Decide on a process model for a developing a software project
- Classify software applications and identify unique features of various domains
- Design test cases of a software system.
- Understand basics of IT Project management.
- Plan, schedule and execute a project considering the risk management.
- Apply quality attributes in software development life cycle.

<b>Modules</b>	<b>Sr. No.</b>	<b>Topic and Details</b>	<b>No. of Lectures Assigned</b>	<b>Marks Weightage %</b>
<b>UNIT - I</b>	1.	<b>Introduction to Software Engineering, Software Process Models:</b> Software Engineering Fundamentals: Nature of Software, Software Engineering Principles, The Software Process, Software Myths. Process	3	6
	2	<b>Models:</b> A Generic Process Model, Prescriptive Process Models: The Waterfall, Incremental Process (RAD), Evolutionary Process, Unified Process, Concurrent.	4	8
	3	<b>Advanced Process Models &amp; Tools:</b> Agile software development: Agile methods, Plan-driven and agile development	3	6
<b>UNIT-II</b>	4	<b>Software Requirements Engineering &amp; Analysis Requirements:</b> User and system requirements, Functional and non-functional requirements, Types & Metrics, A spiral view of the requirements engineering process	4	8
	5	<b>Software Requirements Specification (SRS):</b> The software requirements Specification document, The structure of SRS, Ways of writing a SRS, Requirements validation, Requirements management.	3	6

	6	<b>Design representations:</b> flowcharts, pseudo code, HIPO and techniques	3	6
	7	<b>Modular design:</b> Overview, module coupling and cohesion, various types of coupling, merits and demerits, other approaches to Programming.	4	8
UNIT-III	8	<b>Project Management:</b> Process, Metrics, Estimations & Risks <b>Project Management Concepts:</b> The Management Spectrum, People, Product, Process, Project, The W5HH Principle, Metrics in the Process and Project Domains	3	6
	9	<b>Software Measurement:</b> size & function oriented metrics (FP & LOC), Metrics for Project and Software Quality	3	6
	10	<b>Project Estimation:</b> Observations on Estimation, Project Planning Process, Software Scope and feasibility	4	8
	11	<b>Resources:</b> Human Resources, Reusable software, Environmental Resources. Software Project Estimation, Decomposition Techniques, Empirical Estimation Models: Structure, COCOMO II, Estimation of Object- oriented Projects	4	8
UNIT-IV	12	<b>Project Management: Risk Management, Configuration Management, Maintenance &amp; Reengineering</b> <b>Project Risk Management :</b> Risk Analysis & Management: Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Risks Monitoring and Management, The RMMM plan for case study project	4	8
	13	<b>Software Configuration Management:</b> The SCM repository, SCM process, Configuration management for Web Apps	4	8
	14	<b>Maintenance &amp; Reengineering:</b> Software Maintenance, Software Supportability, Reengineering, Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering	4	8
<b>TOTAL</b>			<b>50</b>	<b>100</b>

**Text Book:**

1. Roger Pressman, —Software Engineering: A Practitioner's Approach, McGrawHill,

**Reference Books:**

1. Shooman "Software Engineering Design, Reliability and Management" McGrawHill 1983
2. Fairley "software Engineering concepts" " McGraw--Hill Series, New York,
3. Software Project Management, Bob Huges, Mike Cotterell, Rajib Mall, 5/E, TataMcGraw Hill Edu. (India) Pvt. Ltd.
4. Software Quality Engineering , Jeff Tian , Wiley India Ltd.