Fifth Semester

Course Code: BTES 501-20	Course Title: Statistical Computing Techniques using R	3L:0T:0P	3 Credits

Course Contents:

UNIT 1: CO1, CO2 [8 Hrs.]

General introduction to computing, Using R as a calculator, Numbers, words and logicals; missing values (NA), Vectors and their attributes (names, length, type), System- and user-defined objects, Accessing data (data()). Data in the system and date outside the system (read.table, scan)

UNIT 2: CO1, CO2 [10 Hrs.]

First steps in graphics, The basics of R syntax, The R workspace, Matrices and lists, Subsetting System-defined functions; the help system, Errors and warnings; coherence of the workspace Data input and output; interface with other software packages, Writing your own code; R script Good programming practice, R syntax -- further steps The parentheses and brackets; =, == and <–

Apply-type functions Compiling and applying functions Documentation, Conditional statements Loops and iterations

UNIT 3: CO1, CO2 [8 Hrs.]

Exploratory data analysis, Range, summary, mean, variance, median, sd, histogram, box plot, scatterplot

Probability distributions, Random number generation Distributions, the practice of simulation.

UNIT 4: CO1, CO2, CO3 [8 Hrs.]

Statistical functions in R, Statistical inference, contingency tables, chi-square goodness of fit, regression, generalized linear models, advanced modelling methods, the bootstrap method to compute s.e.f

UNIT 5: CO1, CO3 [8 Hrs.]

Graphics; beyond the basics Graphics and tables, Working with larger datasets, Principles of exploratory data analysis (big data analysis)

Dataframes in R, Defining your own classes and operations Models and methods in R, Customising the user's environment

Reference Books:

1. Matloff, N. (2011). The Art of R Programming: A Tour of Statistical Software Design, William
2. Philip H. Pollock (2014). An R Companion to Political Analysis, CQ Press
3. Chihara, L. and Hesterberg, T. (2011), Mathematical statistics with resampling and R, Wiley
4. Lander, J. P. (2014) R for Everyone: Advanced Analytics and Graphics, Addison-Wesley Data & Analytics Series

Course Outcomes:

At the end of the course, students will have learned:

CO1: To use a fundamental tool for computing in the practice of quantitative analytical methods (the 'paper-and-pencil' tool of the 21st century), that can work for the small jobs (like a pocket calculator) as well as for the big jobs (complex statistical data analysis).

CO2: Programming, data handling, transformations, subsetting, exploratory data analysis, probability distributions and simulations, regression and linear models, summarising data, how to handle large data sets, effective graphics.

CO3: Modern concepts of statistics based on simulations and writing a report of a quantitative analysis.

Course Code: BTES 502-20	Course Title: Statistical Computing Techniques using R lab	0L:0T:2P	1 Credits

Details of Experiments

1. Familiarization of environments in R.
2. Perform simple arithmetic's using R.
3. Perform basic R functions.
4. Use various graphical techniques in EDA.
5. Create different charts for visualization of given set of data.
6. Find the mean, median, standard deviation and quartiles of a set of observations.
7. Find the Skewness and Kurtosis of a given dataset distribution.
8. Given the scenario, implement the Bayes rule by finding the posterior probability.
9. Find the mass function of a binomial distribution with n=20,p=0.4n=20,p=0.4. Also draw the graphs of the mass function and cumulative distribution function.
10. Generate and draw the cdf and pdf of a normal distribution with mean=10 and standard deviation=3. Use values of xx from 0 to 20 in intervals of 1.
11. Construct a scatter plot to investigate the relationship between two variables.
12. Perform the Z- test for single proportion, single mean etc.
13. Calculate the regression coefficient and obtain the lines of regression for the given data.
14. Compute confidence intervals for the mean when the standard deviation is known.
15. Perform F test
16. Perform Chi-Square test.

Course Outcomes:

The Students will try to Learn:
CO1. Data manipulation, plot the graphs and charts with the help of computing features in R Programming.
CO2. The given data Interpretation with different distribution functions
CO3. The relevance and importance of the theory in solving practical problems in the real world

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Course Code: BTCS501-18	**Course Title:** Database Management Systems	**3L:0T:0P**	**3Credits**

Detailed Contents:

Module 1: Database system architecture

Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented Data models, integrity constraints, data manipulation operations.

[7hrs] (CO1,2)

Module 2: Relational query languages

Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server. Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design. Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

[10hrs] (CO2,4)

Module 3:

Storage strategies, Indices, B-trees, hashing.

[3hrs] (CO3)

Module 4: Transaction processing

Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

[6hrs] (CO3)

Module 5: Database Security

Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.

[8hrs] (CO 4,5)

Module 6: Advanced Topics

Object oriented and object relational databases, Logical databases, Web databases, Distributed databases.

[8hrs] (CO 5)

Course Outcomes:

At the end of study, the student shall be able to:

CO1: write relational algebra expressions for a query and optimize the Developed expressions
CO2: design the databases using ER method and normalization.
CO3: construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.
CO4: determine the transaction atomicity, consistency, isolation, and durability.
CO5: Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

Text Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

Reference Books:

1. "Principles of Database and Knowledge–Base Systems", Vol1 by J. D. Ullman, Computer Science Press.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education.
3. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

Course Code: BTCS505-18	**CourseTitle:** Database management System lab	**0L:0T:2P**	**1Credits**

List of Experiments:

Task 1: Introduction to SQL and installation of SQL Server / Oracle.
Task 2: Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.
Task 3: Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Update and Delete Statements.
Task 4: Set Operators, Nested Queries, Joins, Sequences.
Task 5: Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.

Task 6: PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.
Task 7: Stored Procedures and Exception Handling.
Task 8: Triggers and Cursor Management in PL/SQL.

***Suggested Tools* –** MySQL, DB2, Oracle, SQL Server 2012, Postgre SQL, SQL lite

Course Outcomes:

CO1: This practical will enable students to retrieve data from relational databases using SQL.

CO2: students will be able to implement generation of tables using datatypes

CO3: Students will be able to design and execute the various data manipulation queries.

CO4: Students will also learn to execute triggers, cursors, stored procedures etc.

Course Code: BTCS502-18	**Course Title:** Formal Language & Automata Theory	**3L:0T:0P**	**3Credits**

Detailed Contents

Module 1: Introduction
Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

[3hrs] (CO1)

Module 2: Regular languages and finite automata:
Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.

[8hrs] (CO2)

Module 3: Context-free languages and pushdown automata
Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.

[8hrs] (CO3)

Module 4: Context-sensitive languages
Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.

[5hrs] (CO4)

Module 5: Turing machines

The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

[8hrs] (CO 5)

Module 6: Undecidability & Intractablity:

Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.
Intractablity: Notion of tractability/feasibility. The classes NP and co-NP, their importance. Polynomial time many-one reduction. Completeness under this reduction. Cook-Levin theorem: NP-completeness of propositional satisfiability, other variants of satisfiability. NP-complete problems from other domains: graphs (clique, vertex cover, independent sets, Hamiltonian cycle), number problem (partition), set cover

[12hrs] (CO5)

Course Outcomes: The student will be able to:

CO1: Write a formal notation for strings, languages and machines.

CO2: Design finite automata to accept a set of strings of a language.

CO3: Design context free grammars to generate strings of context free language.

CO4: Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars

CO5: Distinguish between computability and non-computability and Decidability and undecidability.

Text Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

Reference Books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

Course Code: BTAIML 502-20	Course Title : Artificial Intelligence	3L:0T:0P	3 Credits

Detailed Contents:

UNIT 1: Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

[**8hrs] (CO 1)**

UNIT 2: Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

[6hrs] (CO 2)

UNIT 3: Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

[6hrs] (CO 3)

UNIT 4: Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

[6hrs]
(CO 4)

UNIT 5: Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

[6hrs] (CO 5)

Course Outcomes:

At the end of the course the student should be able to:

CO 1: Understand different types of AI agents.

CO 2: Develop different types of various AI search algorithms.

CO 3: Construct simple knowledge-based systems and to apply knowledge representation.

CO 4: Convert intermediate representation in contest to understand learning.

CO 5: Apply for various techniques for Expert Systems.

Text Book:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, PrenticeHall, 2010.

Reference Books:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

Course Code: BTAIML504-20	Course Title Artificial Intelligence Lab	L:0;T:0;P:2	1 Credits

Detailed List of Tasks:

1.Write a programme to conduct uninformed and informed search.

2. Write a programme to conduct game search.

3. Write a programme to construct a Bayesian network from given data.

4. Write a programme to infer from the Bayesian network.

5. Write a programme to run value and policy iteration in a grid world.

6. Write a programme to do reinforcement learning in a grid world

Lab Outcomes: At the end of the course, the students are able to:

1. Explain artificial intelligence, its characteristics and its application areas.
2. Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.
3. Select and apply appropriate algorithms and AI techniques to solve complex problems.
4. Design and develop an expert system by using appropriate tools and techniques.

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Course Code: BTAIML501-20	Course Title: Programming in Python	3L:0T:0P	3 Credits	42 Hours

Detailed Contents:

Module 1:

Introduction to Python Programming Language: Programming Language, History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages.

Python Data Types & Input/Output: Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command.
Operators and Expressions: Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.

[8hrs] (CO1)

Module 2:
Control Structures: Decision making statements, Python loops, Python control statements (break and continue), Asserts.
Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).

[10hrs] (CO1, 3)

Module 3:
Python Functions: Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables.
Python Modules: Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.

[8hrs] (CO 1, 2,3)

Module 4:
Exception Handling: Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.
File Management in Python: Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.
Classes and Objects: The concept of OOPS in Python, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes, Garbage collection, Destroying objects. **[10hrs] (CO 2, 4)**

Module 5:
Generators and Iterators: Iterators, Generators, any and all functions, with statement, data compression.
Collections: namedtuple(), deque, ChainMap, Counter, OrderDict, DefaultDict, UserDict, UserList, UserString
Python Date and Time.

[6 hrs] (CO5)

Text Books:

1. Python programming: using problem solving approach, Reema Thareja, Oxford University Press.
2. Programming in Python, Pooja Sharma, BPB Publications.

Course Outcomes:

The students should be able to:

CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2: Demonstrate proficiency in handling Strings, Exceptions, and File Systems.
CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
CO5: Implement exemplary applications using date and time, generators, iterators, and collections in Python.

Course Code: BTAIML503-20	**Course Title:** Programming in Python Lab	**0L:0T:2P**	**1 Credits**

Prerequisites: Students should install Python.

List of Experiments:

Task 1: Write a program to demonstrate different number data types in Python.
Task 2: Write a program to perform different Arithmetic Operations on numbers in Python.
Task 3: Write a program to create, concatenate and print a string and accessing sub-string from a given string.
Task 4: Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
Task 5: Write a program to create, append, and remove lists in python.
Task 6: Write a program to demonstrate working with tuples in python.
Task 7: Write a program to demonstrate working with dictionaries in python.
Task 8: Write a python program to find largest of three numbers.
Task 9: Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
Task 10: Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * *
* *
*
*
```

Task 11: Write a Python script that prints prime numbers less than 20.
Task 12: Write a python program to find factorial of a number using Recursion.
Task 13: Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
Task 14: Write a python program to define a module to find Fibonacci Numbers and import the module to another program.

Task 15: Write a python program to define a module and import a specific function in that module to another program.

Task 16: Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

Task 17: Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.

Task 18: Write a Python class to convert an integer to a roman numeral.

Task 19: Write a Python class to implement pow(x, n)

Task 20: Write a Python class to reverse a string word by word.

ELECTIVE-I

BTAIML 505-20	**Data Visualization Using Tableau**	**3L:0T:0P**	**3 Credits**

Course Objectives:

Students should be able to describe and implement various:-

1. To understand the tableau terminologies and its fields.
2. To explain the methodologies to create a chart.
3. To gain knowledge about the different Chart types in tableau.
4. To get used with chart types and frameworks.

Detailed contents:

UNIT 1 INTRODUCTION TO DATA VISUALIZATION AND TABLEAU:

Acquiring and Visualizing Data, Applications of Data Visualization, Key Factors of Data Visualization. Introduction to Tableau Connecting to Data in Tableau, Shaping Data for Use with Tableau, Tableau Terminology, Views of data and records, Measure, Dimension, Discrete and Continuous.

(9 hrs., CO1)

UNIT 2 CREATION OF CHARTS IN TABLEAU:

Creation of bar charts in Tableau, Aggregation, Line Graphs, Independent Axes, Date Hierarchies, Marks Cards, Encoding, Level of Detail, Filters, Calculated fields, Table Calculations: - Parameters, Level of detail expressions, Dashboards and distribution.

(10 hrs, CO2)

UNIT 3 CHART TYPES:

Spreadsheet – Highlight table, Heat Map, Dual-Axis Combination Chart, Scatter Plot, Tree Map, Spark lines, Small Multiples, Bullet graphs, Stacked area, Histogram, Box and Whisker Plot, Symbol Map, Mapbox , Filled Map , Dual axis Map, Sequential Map , Polygon Maps, Gant Chart , Waterfall Chart, Dual, Axis Slope Graphs , Donut Chart , Funnel Chart, Pace chart ,Pareto Chart , Control Chart , Dynamic Dual-Axis Bump Chart ,dumbbell Chart .

(10 hrs, CO3)

UNIT 4 DATA CONNECTIVITY, TRENDS AND FORECASTING:

Data Joins, updates, exits, updating charts, Icon-Based Navigation, Filters – Analysis using Parameters , Adding alerts to dashboards, Methodology Using Custom Shape Palettes , Tableau

Data Visualization Tips, Alternative Approaches to Pie Charts ,One-Dimensional Unit Charts , Insight Framework for Data Visualization , Steps in Insight Framework – Introduction to Data Storytelling and its elements . Trends and Forecasting – Create trend lines – Model types – Create forecast.

(13 hrs, CO4,5)

Course Outcomes: At the end of the course, students will be able to:

CO1 Infer the representation of tableau and its fields.

CO2 Explore charts that are present in tableau.

CO3 Apply the various charts used for data visualization

CO4 Apply visualization tips in charts

CO5 Learn to connect the Database to tableau and forecast the predictions.

Text Books:

1 Ryan Sleeper," Practical Tableau" O'Reilly Media, Inc, First Edition, 2018
2 Learning Tableau 2020: Create effective data visualizations, build interactive visual analytics, and transform your organization, 4th Edition, 2020

Extensive Reading:

1. https://www.datacamp.com/courses/introduction–to–data–visualization–with–python
2. https://machinelearningmastery.com/data–visualization–methods–in–python
3. https://www.kaggle.com/benhamner/python–data–visualization

BTAIML 505-20	**Data Visualization Using Tableau Lab**	**0L:0T:2P**	**1 Credits**

Laboratory Work as given in the theory curriculum as guided by the instructor.

BTAIML 509-20	Java Programming	3L:0T:0P	3 Credits

Detailed contents:

UNIT 1:

The Java Environment: Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions.

Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Operators Assignments.

5 hrs., CO1, CO5

UNIT 2:

Object Oriented Programming: Class Fundamentals, Object & Object reference, Object Life time & Garbage Collection, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods Nested, Inner Class &Anonymous Classes, Abstract Class & Interfaces Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, dealing with Static Members, Finalize() Method, Native Method. Use of "this "reference, Use of Modifiers with Classes & Methods, Design of Accessors and Mutator Methods Cloning Objects, shallow and deep cloning, Generic Class Types.

Extending Classes and Inheritance: Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of "super", Polymorphism in inheritance, Type Compatibility and Conversion Implementing interfaces.

10 hrs., CO2, CO5

UNIT 3:

Package: Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages Import and Static Import Naming Convention for Packages.

Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow in Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.

Array & String: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String, Tokenizing a String, Creating Strings using StringBuffer.

Thread: Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads, Critical Factor in Thread –DeadLock,

10 hrs., CO3, CO5

UNIT 4:

GUI Programming: Designing Graphical User Interfaces in Java, Components and Containers, Basics of Components, Using Containers, Layout Managers, AWT Components, Adding a Menu to Window, Extending GUI Features Using Swing Components, Java Utilities (java.util Package) The Collection Framework : Collections of Objects , Collection Types, Sets , Sequence, Map, Understanding Hashing, Use of ArrayList & Vector.

10 hrs., CO4, CO5

UNIT 5:

Database Programming using JDBC: Introduction to JDBC, JDBC Drivers & Architecture, CURD operation Using JDBC, Connecting to non-conventional Databases.

Java Server Technologies Servlet: Web Application Basics, Architecture and challenges of Web Application, Introduction to servlet, Servlet life cycle, Developing and Deploying Servlets, Exploring Deployment , Descriptor (web.xml), Handling Request and Response.

8 hrs., CO4, CO5

Course Outcomes: At the end of the course, students will be able to:

CO1: Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism

CO2. Design and develop java programs, analyze, and interpret object oriented data and report results.

CO3. Design an object oriented system, AWT components and multithreaded processes as per needs and specifications.

CO4: Understand the database connectivity and design web based applications on client server model

CO5. Participate and succeed in competitive examinations like GATE, Engineering services, recruitment interviews etc.

REFERENCES:

Text Books:

1. The Complete Reference Java, Herbert Schildt, ISBN: 978-0-07163177-8, Publisher: McGraw Hill, 7th Edi.

2. Thinking in Java, Bruce Eckel, ISBN: 0-13-187248-6, Publisher: Prentice Hall 4th Edition

3. The Java Programming Languages,, Ken Arnold, ISBN-13: 978- 032134980, Publisher: Sun 4th Edition,

4. Java in Nutshell,, Benjamin,ISBN: 9781449371296, Publisher: O'Reilly Media, Inc. 6th Edi.

BTAIML 510-20	Java Programming Lab	0L:0T:2P	1 Credits

LIST OF EXPERIMENTS:

1. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

2. . Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

3. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer?

4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome?

5. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

6. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

7. Write a Java program for the following: Create a doubly linked list of elements. Delete a given element from the above list. Display the contents of the list after deletion.

8. a) Develop an applet in Java that displays a simple message.

b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

9. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

10. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.

11. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

12 Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

13. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

REFERENCE BOOKS

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

2. Thinking in Java, Bruce Eckel, Pearson Education.

3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.

4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

Course Outcomes: At the end of the course, students will be able to:

CO1: Use Java compiler and eclipse platform to write and execute java program.

CO2: Understand and Apply Object oriented features and Java concepts.

CO3: Apply the concept of multithreading and implement exception handling.

CO4: Access data from a Database with java program.

CO5: Develop applications using Console I/O and File I/O,GUI applications

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.

2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

Course Code: BTAIML507-20	Course Title: User Interface development	3L:0T:0P	3 Credits	42 Hours

Detailed Contents:

UNIT 1:

The User Interface: Introduction & Overview, The importance of user interface – Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces, Principles of user interface design. (8L)

UNIT 2:

The User Interface Design process: Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards. (8L)

UNIT 3:

System menus and navigation schemes : Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, Selecting menu choices, Navigating menus, Kinds of graphical menus (8L)

UNIT 4:

Windows: Characteristics, Components of window, Window presentation styles, Types of window, Window management, Organizing window functions, Window operations, Web systems, Characteristics of device based controls. (8L)

UNIT 5:

Screen based controls: Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests. (8L)

Text Book:

1. Wilbert O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, Second Edition 2002.

Reference Books:

1. Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.

2. Alan Cooper, "The Essential of User Interface Design", Wiley- Dream Tech Ltd.,2002

Course Code: BTAIML508-20	**Course Title: user interface development** Lab	**0L:0T:2P**	**1 Credits**

Design and Development of User Interfaces using HTML, CSS, JavaScript and Angular JS / Node JS technologies