TITLE: PYTHON PROGRAMMING

PAPER CODE:21UB303T	CREDITS :3	TOTAL NO OF HRS: 48

Objectives:

- ✓ Learn the syntax and semantics of Python programming language.
- ✓ Illustrate the process of structuring the data using lists, tuples and dictionaries.
- ✓ Demonstrate the use of built-in functions to navigate the file system.
- ✓ Implement the Object-Oriented Programming concepts in Python.

Course Outcome:

- Interpret the concepts of object-oriented programming as used In python.
- Demonstrate proficiency in handling of loops and creation of functions.
- Discover the use of functions, modules and tuples.
- Analyze the methods to create and manipulate lists, and dictionaries.

MODULE 1	**INTRODUCTION TO OBJECT ORIENTED PROGRAMMING:** **Overview:** Why Python, features, setting up path, working with python, basic syntax, identifiers, keywords, variable and data type operators, comments. **Object oriented programming:** Introductions, OOP, classes, class attributes, classes with multiple objects, instances, instance attributes, Encapsulation, Basics of polymorphism. Difference between POP & OOP's.	**12hrs**
MODULE 2	**CONTROL STATEMENTS:** **Indentation**: Reading input, print output, type conversion. **Condition statements**: if, if-else, elif, nested if. **Looping**: for, while, Nested loop. **Control statements**: Break, continue, pass. **Operators**: Arithmetic Operators, Assignment Operators, Logical Operators, Comparison Operators, Identity Operators, Bitwise Operators. **Inheritance:** Create a parent class, child class, add the __init__ () function. Use the super () function, add properties, add methods.	**12hrs**
MODULE 3	**Function, Modules & Tuples:** **Functions**-, function definition and calling the function, arguments, command line arguments, number of arguments, arbitrary arguments, keyword arguments, arbitrary keyword arguments, passing a list as an arguments, return values, recursion, Lambda, Built in functions and User define functions. **Modules**: What are modules, variables in modules, importing modules, using dir() function. **Tuples**: Basic tuple operations, Tuple () datatypes. The tuple () constructor, indexing and slicing in tuples, access tuple, update tuple, unpack tuple, tuple methods, joint tuple.	**12hrs**

MODULE 4	**LIST, DICTIONARIES, STRINGS & EXCEPTION HANDLING:** **Sets:** Set operations, access set items, add set items, remove setitems, loop sets, join sets, sets methods. **Lists**: List operations, list comprehension, sort list, copy list, join list, list methods. **Dictionaries**: creating, accessing and modifying, dictionary methods, loop dictionary, copy dictionary, nested dictionary. **Strings**: Slicing Strings, modify strings, concatenate strings, format strings, string methods. **Error & Exceptions**: Introduction to Exceptions, many exceptions, finally, raise an exception.	**12hrs**

Text Books:

1. Let Us Python, 4th Edition, Kanetkar Yashavant, Kanetkar Aditya BPB Publication.
2. Core Python Programming, 3rd Edition, Dr. Nageswara Rao, Dream Tech Press.
3. Python for Everybody: Exploring Data in Python 3, by Dr. Charles Russell Severance, Sue Blumenberg.
4. Introduction to Python Programming by Gowrishankar S, Veena A, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372,
5. Programming in Python 3 A Complete Introduction to the Python Language, Mark Summerfield, Addison-Wesely Reprint 2011
6. "Beginning Python: from novice to professional". 3rd Edition, Hetland, Magnus Lie., Apress, ISBN 978-1-4842-0029-2, 2017
7. An Introduction to computer Science using Python 3.6, Paul Gries, Jennifer Campbell, Jason Montojo, 3rd Edition, Shroff publishers and distrubtors Pvt, Ltd. ISBN: 13:978935213681-0, 2018

Reference Books:

1. Barry, Paul, *Head First Python*,2nd Edition,ORielly, 2012.
2. Lutz, Mark, *Learning Python*, 4th Edition, O Rielly, 2013
3. Sneeringer, Luke," Professional Python", John Wiley & Sons, ISBN -978-1-119-07085-6, 2016.
4. Wesley J Chun, "Core Python Programming", third edition, Pearson Education, ISBN 13: 978-0-13-267820-9, 2012
5. Think Python, Allen Downey, Version 2.0.17, Green Tea Press, Needham, Massachusetts, 2012

TITLE: Database Management Systems

PAPER CODE:B(DS)	CREDITS : 5	TOTAL NO OF HRS: 52

Objectives:

This course enables students to understand:

- ✓ Advanced topics in database management and programming including client server application development are introduced.
- ✓ Expands knowledge of data modeling concepts and introduces object-oriented data modeling techniques

MODULE 1	Introduction, Database Systems: Introduction, Database Systems Characteristics of DB Approach, Advantages of DBMS, Database Users, DB Languages, Applications of Database.	**08hrs**
MODULE 2	Data Model Concepts: Data Model Concepts, Database System Architecture-Centralized, Client/Server: Two- tier, Three-tier, Three-Schema Architecture-Physical Data Independence and Logical Data Independence, Different types of data models, Database Interfaces.	**08hrs**
MODULE 3	E-R Model concepts E-R Model concepts- Entities, Attributes, Relationship, E-R model constraints, E-R diagrams, Relational model concepts, Characteristics of relations, constraints on relations, Relational Algebra-Unaryand Binaryoperations.	**09 hrs**
MODULE 4	**SQL** SQL:DDL - Create table/views, Drop, Alter commands, DML - Insert, Delete, Update, Select, queries ,sub-queries, nested queries, Joins – equijoin, non-equijoin, Built-in functions of SQL & grouping. Concept of Functional dependency, Normalization – 1NF,2NF,3NF.	**09 hrs**

MODULE 5	Secondary Storage device: Secondary Storage devices, Buffering of Blocks, Files on disk, Operations on files, File organization: Ordered files, Hashed files, Indexed files, Heap files, RAID organization.	**09hrs**
MODULE 6	Concurrency Control Techniques Concurrency Control Techniques, Recovery Techniques on databases, Transaction processing concepts, Database security and authorization. Introduction to Distributed databases, Data fragmentation, Replication and Allocation in distributed database, Query Processing in Databases.	**09hrs**

Text Books:

1. RemezElmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", 5 th Edition, Pearson Education, 2007.

Reference Books:

1. Abrahamsi.Silberschatz,Henry.F.Korth,S.Sudarshan,"DatabaseSystemConcepts" 6th Edition, McGraw Hill, 2012.
2. C.J.Date, "Introductiontodatabasesystems",Eight Edition, Addison Wesley

TITLE: Design and Analysis of Algorithms

PAPER CODE: B(DS)3.2	CREDITS: 3	TOTAL NO OF HRS: 48

Objectives:

✓This course aims to introduce the classic algorithms in various domains, and techniques fordesigning efficient algorithms.

Course Outcomes:

- This course aims to introduce the classic algorithms in various domains and helps the introduction of various techniques for designing efficient algorithms.
- To understand the Greedy method and different approach of scheduling and briefing about the Knapsack problem.
- Recognizing the different method dynamic programming, analysis of designing and problems on Travelling salesman.
- To analyze the various techniques such as backtracking, branch and bound method and applications on solving 4-queens problem.

MODULE 1	**Introduction to Analysis and Design of Algorithms** A simple example of Design, Insertion sort, pseudocode for insertion sort ,analysis of time complexity, Asymptotic notations and time complexity and writing efficient programs (by considering some small programs). Harner's method of evaluating a polynomial at a given point, finding maximum and minimumfor a given set of numbers, straight max, straight min, combinations for max and min. Analysis of linear and binary search algorithms.	**12hrs**
MODULE 2	**Divide and Conquer Algorithms** Divide and conquer algorithms, Sorting, multiplication of two long integers, Stassen's matrix multiplication	**09hrs**
MODULE 3	**The Greedy Method.** Greedy approach, optimum scheduling, fractional Knapsack problem, minimum spanning trees, single source shortest path problem.	**09 hrs**
MODULE 4	**Dynamic Programming** Dynamic programming, Design and analysis, Travelling salesman problem, optimal parameterization for product of a sequence of matrices.	**09 hrs**
MODULE 5	**Back Tracking and Branch and Bound** Backtracking and Branch and bound methods,leastcostmethod,4-queens problem using backtracking ,travelling salesman problem using branch and bound method.	**09 hrs**

Text Books:

1. Design&AnalysisOfAlgorithmsbySSrikanth,PublishedbySkywardPublishers
2. A.MPadmaReddy,SeventhrevisededitionFebruary2014,SriNandiPublication

Reference Books:

1. TheDesignandAnalysisofComputerAlgorithmsbyAho,HopcroftandUllman.
2. FundamentalAlgorithms:TheartofComputerprogramming(VolI)byD.E.Knuth.

TITLE: MACHINE LEARNING I

PAPER CODE: B(DS)4.1	CREDITS : 3	TOTAL NO OF HRS: 48

Objectives:

- ✓ This course will serve as a comprehensive introduction to various topics in machine learning.
- ✓ At the end of course student be able to design and implement machine learning solutions to classification, regression and clustering problems.
- ✓ It evaluates and interpret the results of algorithms.

Course Outcome:

- Understanding the concept of Machine Learning in terms of different learning techniques, graphical representation and brief review on Linear algebra.
- Recognizing proper method of implementing the regression graphs and equations.
- Applying proper methodology in solving the hypothesis and learning more about advance application based optimization techniques.
- Learning various methods of machine learning such as Artificial Neural Network, classification technique, evaluating hypothesis model and learning curves.

MODULE 1	Introduction ,What is Machine Learning?,Supervised Learning,Unsupervised Learning,Linear Regression with One Variable Model Representation,Cost Function,Gradient Descent method for linear egression. A review of Linear Algebra.	**11hrs**
MODULE 2	Linear Regression with Multiple Variables, Gradient Descent for Multiple Variables, and Polynomial Regression, Normal Equation	**09hrs**
MODULE 3	Logistic Regression, Classification, Hypothesis Representation, Decision Boundary,Cost Function, Simplified Cost Function and Gradient Descent,Advanced Optimization	**09hrs**
MODULE 4	Neural Networks: Representation, ,Neurons and the Brain,Model Representation, Examples,Multi-class Classification, Multi-class Classification and Artificial Neural Networks.	**09hrs**
MODULE 5	Applying Machine Learning in Practice, Evaluating a Hypothesis , Model Selection and Train/Validation/Test Sets ,Bias, Variance ,Regularization and Bias/Variance ,Learning Curves	**10hrs**

Text Books:

1. Introduction to machine learning: Nils J Nilsson ,Robotics Laboratory Stanford University.
2. Pattern recognition and machine learning by Chirstopher Bishop , Springer 2006.
3. Understanding of machine learning from theory to algorithm: Shai Shalev – Shwartz, Shai Ben-David, Cambridge university.

Reference Books:

1. Fundamentals of Neural networks :architecture , algorithm and applications by Lauren Fausette, Pearson edition.

TITLE: Data Mining

PAPER CODE: B(DS)4.2	CREDITS : 3	TOTAL NO OF HRS: 48

Objectives:

- ✓ Interpret the contribution of data warehousing and data mining to the decision-support level of organizations.
- ✓ Evaluatedifferentmodelsusedfor OLAPanddatapreprocessing.
- ✓ Categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, association, correlation, classification, prediction, andcluster andoutlier analysis.
- ✓ Design and implement systems for data mining.
- ✓ Evaluatetheperformanceofdifferentdata-miningalgorithms.
- ✓ Proposedata-miningsolutionsfordifferent applications.

Course Outcome:

- To understand the origin and the standards of data mining methods, techniques, motivation and challenges.
- To understand the qualities and types of data and providing the vision on measuring the similarities and dissimilarities of exploring data and a brief on visualization.
- Learn new advance techniques on classification-based algorithms and problems on them.
- Analysis of different data mining methods and techniques such as Association rules, data clustering and classification.

MODULE 1	Introduction to Data Warehousing and Data Mining: Component and Processes, ETL, Data Mart, Decision Support system, Executive Information system. What is Data Mining? Motivating Challenges; The origins of data mining, Data Mining Tasks.	**10hrs**
MODULE 2	Data: Types of Data; Data Quality; Data Preprocessing; Measures of Similarity and Dissimilarity. Exploring Data: OLAP, Multidimensional Data Analysis, Data cube model,Visualization.	**09hrs**
MODULE 3	Classification: Preliminaries; General approach to solving a classification problem, Decision tree induction,ID3,CD4,CART Algorithms, Rule-based classifier; Nearest- neighbor classifier.	**10hrs**
MODULE 4	Association Analysis: Problem Definition,Frequent Item set generation; Rule Generation , Compact representation of frequent item sets, Alternative methods for generating frequent item sets. FP-Growth algorithm, Evaluation of association patterns, Effect of skewed support distribution, Sequential patterns.	**10hrs**
MODULE 5	ClusterAnalysis: Overview, K-means,Agglomerative hierarchicalDBSCAN, Overview of Cluster Evaluation, Applications of DataMining.	**09hrs**

Text Books:

1. Pang-NingTan,MichaelSteinbach,VipinKumar:IntroductiontoDataMining , Pearson Education.
2. Jiawei Han and Micheline Kamber: Data Mining – Concepts and Techniques, 3nd Edition, Morgan Kaufmann.

Reference Books:

1. K.P.Soman, Shyam Diwakar, V.Ajay: Insight into Data Mining – Theory and Practice, PHI.

TITLE: Web Technology

PAPER CODE:B(DS)4.3	CREDITS : 3	TOTAL NO OF HRS: 48

Objectives:

- ✓ Students should learn to develop object-oriented programs using C#.
- ✓ Be able to develop window forms, web forms and GUI based programs.
- ✓ Students will gain the skills and project based experience needed for entry into web application and windows applications.

Course Outcomes:

- To understand .NET Framework, its runtime environment and application development IDE of Visual Studio.
- To understand database concepts in ADO.NET and apply the knowledge to implement distributed data-driven applications.
- Design, document, debug ASP.NET web forms with server and validation controls and implement ASP.NET web services.
- Implement master pages and apply themes using web services.

MODULE 1	**Introduction to .Net Framework and C#:** The .Net Programming Frame work, .Net Languages, Common Language Run Time, The .Net Class Library Necessity of C#, Evolution of C#, Characteristics of C#, Applications, Structure of C# program, Name spaces, providing interactive inputs, multiple main methods, C# tokens, literals, variables, data types, value types, reference types, Boxing and Unboxing, for-each statement, Methods in C#, Handling Arrays.	**09hrs**
MODULE 2	**Classes and Objects:** Defining a class, Adding Variables, Adding Methods, member access modifiers, creating objects, accessing class members, static members and static constructors, constant members and read-only members, properties, indexers, Delegates andEvents.	**07hrs**
MODULE 3	**Data Access with .NET.** ADO.NET overview, Using databaseconnections,commands, The data reader, the dataset class, populating dataset class with a data adapter. The DataGridView Control, DataGridView Class Hierarchy, Data binding.	**07hrs**
MODULE 4	**Developing ASP.NET Application and Web Controls** ASP.NET Application, Code behind model, The Global. Asax application File, Understanding ASP.NET Classes, Web form Fundamentals. Basic Web control classes, Auto Post back and Web control Events, Assessing Web controls Using Visual Studio .NET.	**08hrs**
MODULE 5	**Validation and Rich Controls and State management.** Validation Controls, Validation Process, Validation Classes, Server side Validation Classes, Manual Validation, Understanding Regular Expression, Custom Validation,ViewState,TransferringInformation,CustomCookies,SessionState,ApplicationState.	**09hrs**

MODULE 6	**Master page , Themes, WCF:** Creating master page, simple master page, nested master page, expanding themes, creating themes, applying themes at runtime, features of wcf , routing services, default configuration, creating and using web services, creating and using wcf services.	**08hrs**

Text Books:

1. ProgramminginC#ByEBalagurusamy, FourthEdition(TataMcGrawHillPublications)
2. Comdex.NetProgrammingKit,VikasGupta, Fourtheditiondreamtechpuplication, Asp.netCompleteReference,MacDonald,TataMcGrawHillPublications

Reference Books:

1. ProfessionalC#2005byChristianNagelandOthers(WroxPublications).
2. ASP.NET 3.5 Unleashed, by Stephen Walther SAMS Publishing.
3. Microsoft ASP.NET and AJAX: Architecting Web Applications, by Dino Esposito Microsoft Press.