Tilak Maharashtra Vidyapeeth
Department of Computer Science
Subject: Data mining & KDD (MCA-300-22)

Semester	Third	Teaching Hrs = 60
Subject Code	MCA-300-22	
Subject Name	Data mining & KDD	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**2**	**6**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

* Learn the scope and necessity of data mining and ware housing for society
* Get knowledge of whereas tools of data mining and their techniques to solve the real time problems.
* Develop further interest in research and design of new data mining techniques.

Sr. No.	Chapter / Topic Details	No. of hours
1	**Introduction to Data Mining** • Definition • Data Mining Tasks - Classification - Regression - Change and Deviation Detection - Clustering - Summarization - Dependency Model • DM versus Knowledge Discovery in Databases • Data Mining Issues - Mining Methodology and User Interaction Issues - Performance Issues - Diversity of Database Types • Data Mining Metrics • Application of Data Mining	12

2	**Introduction to Data Warehousing** • Introduction • Architecture of Data Warehousing • OLAP and Data Cubes • Dimensional Data Modeling • Data Preprocessing • Machine Learning • Pattern Matching	10
3	**Data Mining Techniques** • Association Rule Mining Market Basket analysis • Frequent item-sets and Association rule mining • Appori algorithm, • FP growth algorithm, • sampling Algorithm	8

4	**Classification & Prediction**
	
	• Definition of classification
	• Model construction
	• Model Usage
	• choosing algorithm
	• Decision tree learning
	• Information gain, gain ratio, gini index
	• Bayesian Classification,
	  - Bayes Theorem
	  - Naïve Bayes classifier,
	  - Measuring performance of classifiers,
	• Prediction Linear Regression, Non-linear Regression, Logistic Regression
		12

5	**Clustering** • Basic issues in clustering • First conceptual clustering system: Cluster/2 • Partitioning methods: k-means, expectation maximization (EM) • Hierarchical methods: distance-based agglomerative and divisible clustering	9

	• Conceptual clustering: Cobweb	
6	**Data Mining Tool** • Weka • R • Sample Application of Data Mining	9
	Total	60

Reference books:

- Data Mining: Concepts and Techniques - by Jiawei Han
- Introduction to Data Mining - by Michael Steinbach, Pang-Ning Tan, and Vipin Kumar
- Data Mining and Analysis: Fundamental Concepts and Algorithms - by Mohammed J Zaki and Wanger Meria.
- Data Preprocessing in Data Mining - by Francisco Herrera and Salvador Autor Gracia
- Data Mining: Concepts, Models and Techniques - by Florin Gorunescu

Tilak Maharashtra Vidyapeeth
Department of Computer Science
Subject: Python Programming (MCA-301-22)

Semester	Third	Teaching Hrs = 60
Subject Code	MCA-301-22	
Subject Name	Python programming	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**4**	**8**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

- To learn and understand Python programming basics and paradigm.
- To learn and understand python looping, control statements and string manipulations.
- Students will be made familiar with the concepts of GUI controls & designing GUI applications.
- To learn and know the concepts of file handling, exception handling and database connectivity.

Sr. No.	**Chapter / Topic Details**	**No. of hours**
1	**Introduction to Python** • Introduction to Python- an interpreted high level Language, interactive mode and script mode. Variables, Expressions and Statements • Variables and Types-mutable and Immutable variable and Keywords. • Operators and Operands in Python. (Arithmetic, relational and logical Operators), • Operator precedence, Expressions and Statements (Assignment Statement); • Taking input (using raw input () and input ()) and displaying output – print statement • Comments in Python	5

2	**Conditional and Looping Construct** • if - else statement and nested if – else while, for, use of function in for, Nested loops • Break, continue, pass statement • Use of compound expression in conditional constructs	3
3	**Functions** • Built-In Function, invoking built in functions • Module (Importing entire module or selected objects using from statement) • Functions from math, random, time & date module. • Composition • User Define Function: Defining, invoking functions, passing parameters (default parameter values, keyword arguments) • Scope of variables, void functions and functions returning values	7
4	**Strings** • Creating, initializing and accessing the elements; • String operators: +, *, in, not in, range, slice [n:m] • String built in functions & methods: • Strings constants defined in string module Regular Expression and Pattern Matching	4
5	**Lists** • Concept of mutable lists, creating, initializing and accessing the elements of list • List operations (Concatenation, Repetation, Membership, list slices), List comprehensions • List functions & methods: len, insert, append, extend, sort, remove, reverse, pop Tuples • Immutable concept, creating, initializing and accessing the elements in a tuple; • Tuple functions: cmp (), len (), max (), min (), tuple () Sets • Concept of Sets, creating, initializing and accessing the elements of • Sets operation (Membership, union, intersection, difference, and symmetric difference Dictionaries • Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, • Traversing, appending, updating and deleting elements • Dictionary functions & Methods: cmp, len, clear (), get (), has_ key (), Items (), keys (), update (), values ()	10
6	**Modules** • More on Modules: Executing modules as scripts, The Module Search Path, “Compiled” Python files Standard Modules	4

	• The dir ( ) Function • Packages Importing * From a Package, Intra-package References, Packages in Multiple Directories	
7	**File Handling** • Output Formatting • Reading and Writing Files (text and binary mode)	4
8	**Errors and Exceptions** • Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions • User-defined Exceptions, Defining Clean-up Actions (try - finally), Predefined Clean-up Actions	3
9	**Introduction to Object oriented concepts in Python** • Object Oriented concepts • Objects, Python Scopes and Namespaces • Classes, Class Objects, Instance Objects, Method Objects, Class and Instance Variables • Inheritance	7
10	**Database handling using Python**	4
	Total	60

Reference books:

1. Let us python By Kanetkar.Y & Kanetkar A
2. Teach yourself python By Cunningham Katie
3. Python made simple By Beri Rydhm
4. Python for beginners By Bhasin Harsh
5. Learn python in one day By Rungta Krishna

Department of Computer Science

Subject:ASP.NET

Semester	Third	Teaching Hrs = 60
Subject Code	MCA-302-22	
Subject Name	ASP .NET	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**2**	**6**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

- Separate page code from content by using code-behind pages, page controls, and components.
- Display dynamic data from a data source by using Microsoft ASP.Net and data binding.
- Create a web form with server controls.
- Can create a web application with database handling

Sr. No.	Chapter / Topic Details	No. of hours
1	**Introduction to ASP.NET** The .NET Framework, The .NET programming Framework, .NET languages, The .NET class library, ASP vs. ASP.NET, About ASP.NET, Basic difference between C# and VB.NET	**6**
2	**ASP.NET 2.0** Features of ASP.NET 2.0, Stages in Web Forms Processing, Introduction to Server Controls, HTML Controls, Validation Controls, User control, Data Binding Controls, Configuration.	**10**
3	**Declaring Variables in ASP.NET** Data Types, Initializes, Arrays, Enumerations. Variable Operations-Advanced Math Operations, Type Conversions. Object Based Manipulation - String Object, Date Time Object, Time span object &Array	**8**

	Object. Conditional Structures, Loop Structures, Functions & Subroutines – Parameters, Procedure Overloading, Delegates.	
4	**ASP. NET Applications** ASP.NET file types, the bin directory, code-behind, The Global. asax, Understanding ASP.NET classes. ASP.NET configuration	**5**
5	**Performing Data Access in ASP.NET / ADO.net with C#.net** Overview of Data Access, Using the SqlData Source Control, Master Pages concepts, Using the Grid View Control, Using the Details View Control, Using the Form View Control, Using the Repeater Control, Using the Data List, DataGrid Control,	**7**
6	**State Management in ASP.Net:** Client - Side State Management: Cookies, Hidden Field, View State, Query String. Server – Side State Management: Application State, Session State, Database Support, Page level state, Strong objects in Session State, Using Cookie less Session Ids. Caching: An Overview, Data to be Cached – Time Frame, Output Caching.	**10**
7	**ASP.NET Security:** **Authentication**& Authorization users, using windows authentication, using forms authentication, Using the Login Control.	**5**
8	**ASP.NET MVC** Introduction to ASP.NET MVC, ASP.NET MVC Architecture, Understanding Model, Understanding View, Understanding Controller in ASP.NET MVC, creating simple MVC Application.	**8**
	Total	**60**

Reference Books:

1) The complete Reference ASP.NET by Matthew MacDonald- Tata McGraw-Hill.
2) Professional ASP.NET – Wrox Publication
3) Microsoft .NET XML Web Services Step by Step by Adam Freeman

For tutorial http://www.homeandlearn.co.uk/csharp/csharp.html

Tilak Maharashtra Vidyapeeth
Department of Computer Science
Subject: Webs Development using Java (MCA 303-22)

Semester	Third	Teaching Hrs = 60
Subject Code	MCA-303-22	
Subject Name	Web application Development using JAVA	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**2**	**6**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

- Learn to access the database through Java programs, using Java Database Connectivity (JDBC)
- Understand integrated development environment to create, debug and run multi-tier and enterprise-level applications
- Create dynamic web pages, using Servlets and JSP.
- Make a reusable software component, using Java Bean

Sr. No	Topic	No of Hours
1	**Basics Of Java** Java Language Environment • Java – What, Where and Why? • History and Features of Java • Internals of Java Program • Difference between JDK, JRE and JVM • Internal Details of JVM	2
2	**Java Fundamental Variables** • Variable declaration • Life time of variables • Initial values of variables • Default values of variables • Initializing local variables of primitive data types • Initializing local reference variables **Data types**	8

	• **Primitive data types (Predefine)**
	  ○ byte
	  ○ short
	  ○ int
	  ○ long
	  ○ float
	  ○ double
	  ○ boolean
	  ○ char
	• **Non-Primitive data types (User Define)**
	  ○ class
	  ○ Arrays
	Operators
	• Arithmetic Operators
	• Java-instance of-operator
	• Bitwise Operators
	• Relational Operators
	• Boolean Logical Operators
	• Assignment Operators
	Java Artifacts
	• Literals
	• White Spaces
	• Identifiers
	• Keywords
	• Separators
	• Comments
	Importance of Scanner Class in Programming
	String & Arrays	

3	**Control statements**
	• **Decision Making statements**
	  ○ if statements
	  ○ switch statement
	• **Loop statements**
	  ○ do while loop
	  ○ while loop
	  ○ for loop
	  ○ for-each loop
	• **Jump statements**
	  ○ break statement
	  ○ continue statement
		6

4	**Package and interfaces**
	
	• Packages:
	  ○ Introduction to predefined packages (java.lang, java.util, java.io, java.sql, java.swing)
	  ○ User Defined Packages,
	  ○ Access modifiers and their scope
	• Interfaces
		2

5	**OOPS Concepts**
	
	• Introduction
	• Class
	• Object
	• Constructors, types of constructors, this Keyword
	• Inheritance
	  ○ Single Inheritance
	  ○ Multi-level Inheritance
	  ○ Hierarchical Inheritance
	  ○ Hybrid Inheritance
	• Polymorphism (overloading and overriding)
	• Abstraction
	• Encapsulation
	• Garbage Collection
		10

6	**Exception handling** • When an exception occurs. • Importance of Exception Handling • Exception Types • Using try and catch • throw, throws, finally • Writing User defined Exceptions	2
7	**JSP** • Life cycle of JSP • Scripting elements (scriptlet tag, expression tag, declaration tag). • Directives, Declaration, Tags and Session	6
8	**JDBC** • The design of JDBC • Basic JDBS program Concept • Drivers • Making the Connection, Statement, ResultSet	10

	• Executing SQL commands • Executing queries • MetaData	
9	**Servlet** • Introduction • Life cycle of servlet • Types of Servlets • Session Tracking • Cookie class • Servlet- Jdbc	6
10	**MVC architecture**	4
11	**Java Beans**	4
	Total	60

Subject: Mobile Application Development (MCA – 304-22)

Semester	Third	Teaching Hrs =60
Subject Code	MCA-304-22	
Subject Name	**Mobile Application Development**	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**4**	**8**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

* Install and configure Android application development tools.
* Design and develop user interfaces for the Android platform.
* Apply Java programming concepts to Android application development.

Sr. No.	**Chapter / Topic Details**	**No. of hours**
1.	**OOPS concept & Java Revision** • Building Blocks of Android, • Java Classes and Objects, • Class Methods and Instances, • Inheritance and Polymorphism in Java, • Interface and Abstract class.	7
2.	**Android application development** • Overview of Android • Android versions • Features of android • Software development kit • Architecture of Android, Libraries • Components of Android	**8**
3.	**Tools for Development** • Installing Android, • First Android application, • Running on Emulator, • Android development Tools,	**6**

	• Eclipse, IDEs and Tools	
4.	**Android UI & Advance JAVA** • Fundamental Android UI Design, • Introducing Views and view groups, • Introducing Layouts, • Using resources, • Introducing Adapters, • Using themes, • Debugging Android Code, • Introducing layouts, • Creating and using Menus	10
5.	**Application Coding** • Introducing Intents –implicit & explicit • Lifecycle of Activity • Fragments	7
6.	**Android Services** • Playing Audio & Video, • Recording Audio and Video	5
7.	**Database handling** • Introducing Android Databases- Introducing SQLite on Android, • SQLite Open Helper and creating a database • Opening and closing a database, -Inserts, update, and delete • Working with cursors	10
8.	**Accessing Android Hardware** • Audio, Video and Using the camera. • Introducing Sensor Manager	6
	Total	60

Reference Books:

1. Hello, Android by Ed Burnette
2. Professional Android 2 Application Development Paperback, Author, Reto Meier, Wrox Publications
3. Professional Android Application Development
4. by Reto Meier, Wiley India Pub.
5. http://developer.android.com

Subject: Research Methodology (MCA-305-22)

Semester	Third	Teaching Hrs = 30
Subject Code	MCA-305-22	
Subject Name	Research Methodology	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
2		**2**	**30**	**20**	**50**	**2**

Course Outcomes (COs)

After learning this course student will be able to,

* Understand some fundamental concepts of research and related methodologies
* Select and define appropriate research problem and parameters
* Explore steps in conducting research

Sr. No.	**Chapter / Topic Details**	**No. of hours**
1	Introduction to Research - What is research? - Importance of Research - Research process - Essential Qualities of Researcher	**2**
2	Research Process - Steps in Research Process	2
3	Problem Formulation and Research Design - Problem Formulation - Sources of Research problem - Defining Research problem - Research Design - Definition - Importance Research Design	3

	- Basic elements	
4	Hypotheses - Meaning - Definition - Types of Hypotheses - Qualities of Hypothesis - Sources of Hypotheses	3
5	Sampling Techniques - Methods of Collection of Data • Census Method • Sample Method - Terms used in the sampling process - Criteria for deciding sample size - Characteristics of good sample - Sampling techniques • Probability sampling • Non-Probability sampling	4
6	Methods of Data Collection Primary Data - Questionnaire - Observation method • Types of Observation: Advantages, Limitation - Interview Method • Types of Interviews: Advantages, Limitation - Case study method - Projective techniques Secondary Data - Internal Sources - External Sources - Advantages - Limitations	4
7	Measurement and Scaling - How to measure? - Levels of measurement - Scales:	3

	• Likert scale • Graphic rating scale • Employee satisfaction scale	
8	Processing of Data - Meaning - Editing - Coding - Classification - Tabulation Analysis & Interpretation	4
9	Report writing - Usual pattern - Literature review - Methods of study - Result – finding and conclusion - Discussion – suggestions and recommendations - Bibliography - Appendices	5
	Total	30

Reference books:

1. Research Methodology: Methods and Techniques by C. R. Kothari
2. Business research Methodology by Sachdeva J. K
3. Research Methodology in Management by Michael V. P.
4. Research Methodology by Dr. Sumita Joshi

Subject: **Data Analytic (MCA-306-22)**

Semester	Third	Teaching Hrs = 60
Subject Code	MCA-306-22	
Subject Name	Data Analytics	

Teaching Scheme			**Examination Scheme**			**Credits**
Teaching Hrs/Week	Practice/Assignment Hrs/Week	Total Hrs	External Exam	Internal Exam	Total Marks	
4	**2**	**6**	**60**	**40**	**100**	**4**

Course Outcomes (COs)

After learning this course student will be able to,

- Deploying the Data Analytics Lifecycle to address big data analytics projects
- Reframing a business challenge as an analytics challenge
- Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable results
- Selecting appropriate data visualizations to clearly communicate analytic insights to business sponsors and analytic audiences

Sr. No.	**Chapter / Topic Details**	**No. of hrs**
1	**Introduction of Data Analytics** 1.1 Introduction of data analytics 1.2 What is Data analytics 1.3 Importance Data analytics 1.4 Application Data analytics 1.5 Data analytics Tools and Techniques 1.6 Types of Data analytics Predictive data analytics Prescriptive data analytics Diagnostic data analytics 1.7 Life Cycle of Data Analytics 1.8 Roles and Responsibilities of a Data Analyst	**10**
2	**Preprocessing Essentials** 2.1 Data cleaning a) Handling missing data b) Handling noisy data	**5**

	2.3 Scaling and Normalization 2.4 Parsing Dates 2.5 Inconsistent Data Entry	
3	**Python for AI and ML** 3.1 NumPy 3.2 Matplotlib 3.3 Scipy 3.4 Pandas 3.5 Scikit-learn	**5**
4	**Machine Learning Algorithms** **4.1 Supervised Learning** **4.1.1 Regression** Simple Linear, Multiple Linear, polynomial, Support vector machine Decision tree regression, Random Forest regression **4.1.2 Classification** Logistic Regression, k-nearest neighbour (K-NN), Naïve Bayes, Decision tree classification, Random Forest classification **4.2 Unsupervised Learning** 4.2.1 Clustering 4.2.2 k-means clustering 4.2.3 Hierarchical clustering 4.2.4 Apriori algorithm **4.3 Reinforcement Learning** 4.3.1 Natural Language Learning 4.3.2 Dimensionality Reduction 4.3.3 Model Selection Boosting	**12**
5	**Deep Learning** 5.1 Understanding Neural Networks with TensorFlow 5. 2 Deep dive into Neural Networks with TensorFlow 5. 3 Master Deep Networks 5.4 Convolutional Neural Networks (CNN) 5.5 Recurrent Neural Networks (RNN)	**8**
6	**Data Visualization** 6.1 Fundamentals of Data Visualization	**10**

	6.2 Introduction to Power BI 6.3 Data Visualization using Power BI 6.4 Advanced-Data Visualization 6.5 Slicers and Filters in Power BI 6.6 Interactive Visualizations in Power BI 6.7 Creating Paginated Reports 6.8 Creating Dashboards in Power BI	
7	**R programming** 7.1 Introduction to R Programming. 7.2 Introduction to R and RStudio. 7.3 Basic Object Types and Operations in R. 7.4 Data Import and Export. 7.5 Data Visualization. 7.6 Common Statistical Functions.	**10**
	Total	**60**

Reference Books:

1.Introducing Python- Modern Computing in Simple Packages by Bill Lubanovic O' Reilly Media
2. Beginners Guide to Python Programming: Learn Python 3 Fundamentals by SerhanYamacli
3. Data Mining Concepts and Techniques, Third Edition Jiawei Han, Jian Pei, Kamber
4. Python Machine Learning by Wei-Meng Lee wiley publication
5. Applied Supervised Learning with Python: Use scikit-learn by Benjamin Johnston, Ishita Mathu
6. Python Machine Learning by Wei-Meng Lee
7. Deep Learning with Python: Develop Deep Learning Models by Jason Brownlee