SYLLABUS

MTech (CS) Executive

2nd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name MTech Exec (CS) 2nd Semester
Subject Code: CS-6712
Subject Name: Data Science

Aim of the Subject

This course aims to provide sound foundation to fundamental concepts of Data Science and its application and prepare students for advanced research and real time problem solving in Data Science.

Objectives

1. Ability to understand, analyze and design solutions with professional competency for the real-world problems.
2. Ability to develop software solutions for the requirements, based on critical analysis and research.

Learning Outcomes

1. Understand the fundamental concepts of data analytics.
2. Evaluate the data analysis techniques for applications handling large data.
3. Demonstrate the various machine learning algorithms used in data analytics process.

Unit 1

Introduction: What is Data Science?, The Data Science Process, Different Types of Data:
Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit 2

Overview of R, R data types :Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and times

Unit 3

Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers, Cleaning Data with R.

Unit 4

Machine Learning : Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression

Unit 5

Machine Learning : Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.

Text Book(s)

[1] Allan G. Bluman, Elementary Statistics: A Step By Step Approach,10th Edition,McGraw-Hill, 2017.
[2] Paul Teetor, R Cookbook, First Edition, O,ReillyMedia, 2011.
[3] Tom Mitchell, Machine Learning, First Edition, McGraw Hill. 1997

Reference Material(s)

MOOCS of Coursera

Course Name MTech Executive CS 2nd Semester
Subject Code: CS-6223
Subject Name: Python Programming

Aim of the Subject

To provide students with a rigorous theoretical as well as practical grounding for programming in Python programming language.

Objectives

- Fundamental understanding of programming in Python.
- To create a variety of scripts.
- To understand built-in and external module and standard libraries of Python 3.
- To realize the ease of programming in Python.
- To focus on best practices such as Python featured programming, data preprocessing, and working with datasets.

Learning Outcomes

Upon successfully completing this course, students will be able to

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code
- Working with datasets

Unit 1

Introduction to Python Programming Language: Why and for What Python? Built-in Data Types, Variables, Strings and String methods, Numbers, Basic Input, Output and String formatting, Python literals, Operators: Arithmetic, Comparison, Assignment, Logical, Bitwise, Membership, and Identity, Comments, First Python program, Styling Python code.

Unit 2

List: Basic List operations, Indexing, Slicing, and Matrixes, organizing a list, Working with list and a part of a list, Tuple, Conditional Execution, Boolean Expressions, Conditional Statements with Lists, List Comprehension Expression, While and For Loop, Iterations, Documentation Interlude.

Unit 3

Working with Dictionaries, Functions: How functions communicate with their environment? Returning a result from function, Introduction to Scopes, Arguments, and Comprehensions and Generators.

Unit 4

Introduction to Modules and Packages, some useful Modules, Object-Oriented Programming Concepts: Classes and Objects/Instances, Working with Files, Exception Handling: Anatomy of Exception, Some useful Exceptions.

Unit 5

Python Libraries, Introduction to Scipy, Numpy, MatPlotLib, Scikit-Learn and Pandas, Data Preprocessing, Manipulation, and Visualization, Produce Python code to statistically analyze a Dataset.

Text Book(s)

1. Think Python First Edition, by Allen B. Downey
2. Learning Python Fifth Edition, By Mark Lutz

Reference Material(s)