

Vikram University, Ujjain

Board of studies in Computer science (Faculty of Engineering Science)

SYLLABUS of

Certificate Course in Data Analytics

Exclusively for University Teaching Department (ICS, VUU)

Certificate Course in Data Analytics

PROGRAMME of UTD (ICS, VUU)

(Effective from Academic Session 2020-21)

Objective Of Course

Certificate in Data Analytics is a unique six months programme offered by Institute of Computer Science ,Vikram University, Ujjain is an excellent blend of knowledge and practice in the field of Data Science and its industrial applications. The program is targeted for creating qualified Data Science Professionals. The programme also equipped with strong analytical and programming prospects. The objective of this program is to develop Data Scientists and Data Analysts for the IT industries and other industries.

Outcome of the Course:

On completion of the course the participants will learn the concept of Data Analytics using open source statistical tools like Python and some other tools and techniques. The participants will be able to implement industry oriented Data Analytics Project.

Duration of the Course (in days) : 90 days

Minimum Eligibility Criteria and pre-requisites, if any : 10+2 pass with knowledge of basics of Computers

COURSE STRUCTURE

Certificate Course in Data Analytics

Paper code	Title of Paper	Theory External Marks	Min. Pass marks	Internal Marks	Min. Pass marks	Total
CDA-101	Data Mining and Data Warehousing	75	27	25	09	100
CDA- 102	Introduction to Data Analytics	75	27	25	09	100
CDA-103	Internship/Industrial Training/Project Work	<u>150</u>	<u>54</u>	50	28	200
	Total	<u>300</u>		100		400

CDA-101: Data Mining and Data Warehousing

UNIT-1

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas. Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules.

UNIT-2

Clustering paradigms; Partitioning algorithms like K-Medoid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS. Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

UNIT-3

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

UNIT-4

Data Mining of Image and Video: A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

UNIT-5

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLA

Reference Books:

1. Data Mining Techniques ; ArunK.Pujari ; University Press.
2. Data Mining; Adriaans&Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.

CDA -102 : Introduction to Data Analytics

UNIT 1

Descriptive Statistics: Introduction to the Course. Descriptive Statistics, Probability Distribution. Inferential Statistics through Hypothesis test. Regression

UNIT 2

Machine Learning: Differentiate Algorithmic and model based framework. Regression : Ordinary Least Square, K- Nearest Neighbours Regression and classification.

UNIT 3

Supervised Learning with Regression and Classification techniques -1 Bias-Variance Dichotomy Model Validation Approaches Logistic Regression Linear Discriminant Analysis Quadratic Discriminant Analysis Regression and Classification Trees Support Vector Machines

UNIT 4

Unsupervised Learning and Challenges for Big Data Analytics Clustering Associative Rule Mining Challenges for big data analytics

UNIT 5

Prescriptive analytics Creating data for analytics through designed experiments Creating data for analytics through Active learning Creating data for analytics through Reinforcement learning

Text:

1. R. Panneerselvam, “Research Methodologies,” PHI.
2. C.R. Kothari: Research methodology, Methods and Techniques, New Age Publication.
3. S .N.Sivanandam ,S.N.Deepa, “Introduction to Neural Networks using MATLAB 6.0“, TATA MCGraw- Hill publications William Stallings, "Cryptography and Network security", Third Edition, PearsonEd.