

ASC Course: 06

Vidya Prasarak Mandal's



Advanced Study Center



Syllabus for

Programme : P. G. Programme

Course : Data Analysis

[Initiated in 2020 – 2021]

With effect from

Academic Year 2020 – 2021

Course will be conducted on hybrid mode

Theory online practical offline

Preamble:

Data Analytics is the science of analysing data to converting formation of useful knowledge. This knowledge could help us understand our world better, and in many contexts enable us to make better decisions.

Data Analyst is a professional who performs these activities to reveal the hidden truths from the selected data. Data Analytics is a highly demanded profession and in the next few years there will be a big demand in all parts of the world.

Almost every company and organization collects data about their operations to better understand how to make internal improvements. As the amount of data collected increases, it is more difficult to analyse this data manually. There is a growing tendency at bigger companies to automate the collection of large quantities of data (Big Data) to discover behavior patterns and better understand their internal processes. The collection of data (Data Mining) has several applications, including reducing the amount of time needed to make decisions and cutting error margins. Data analytics' prediction abilities can improve a company's marketing, help understand customer behavior, and prevent fraud. Therefore, Data Mining is applicable to every department in any company.

This course prepares students to collect, describe, and analyse data, and use advanced statistical tools to make decisions on operations, risk management, finance, marketing, etc. Analysis is done targeting economic and financial decisions in complex systems that involve multiple partners. Topics include probability, statistics, hypothesis testing, regression, clustering, decision trees, and forecasting.

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Syllabus and Question Paper Pattern of

Course: Data Analysis

Course Code	Course Title	No. of lectures	Credits
ASCDAT1	Introduction to Data Analysis and Statistical Computing	45	4
ASCDAT2	Big Data Analysis and Next Generation Databases	45	4
ASCDAT3	High Performance Computing	45	4
ASCDAT4	Communication Skills and Technical Writing	45	4
ASCAACP1	Practical Training - I	45	4
ASCAACP2	Practical Training - II	45	4
ASCAACP3	Practical Training – III	45	4
Total		315	28

Course Code ASCDAT1	Course Title Introduction to Data Analysis and Statistical Computing	Credits 4	No. of lectures
Unit I: Introduction and Probability Theory <ul style="list-style-type: none"> • Introduction: • Probability Theory 			15
Unit II: Tabular Data and Density Estimation <ul style="list-style-type: none"> • Tabular data • Density Estimation 			15
Unit III: Introduction to R packages			15

Course Code ASCDAT2	Course Title Big Data Analysis and Next Generation Databases	Credits 4	No. of lectures
Unit I: Big Data Analysis <ul style="list-style-type: none"> • Introduction to big data • Predictive Analytics 			15
Unit II: Next Generation Databases <ul style="list-style-type: none"> • Database Revolutions • Big Data Revolution • Column Databases 			15
Unit III: Distributed Database Patterns and Data models <ul style="list-style-type: none"> • Distributed Relational Databases • Data Models and Storage 			15

Course Code	Course Title	Credits	No. of lectures
ASCDAT3	High Performance Computing	4	
Unit I: Principles of Parallel Algorithms <ul style="list-style-type: none"> • Graph Algorithms • Dynamic Programming 			15
Unit II: Distributed-memory parallel programming with MPI <ul style="list-style-type: none"> • Message passing • Synchronization serialization 			15
Unit III: Neural Networks: <ul style="list-style-type: none"> • Introduction to Neural Networks • Healthcare • Banking and Financial 			15

Course Code	Course Title	Credits	No. of lectures
ASCDAT4	Communication Skills and Technical Writing	4	
Unit I: Introduction to Technical Communication and planning:			15
Unit II: Writing Proposals, Informational Reports and Recommendation Reports <ul style="list-style-type: none"> • Writing Proposals • Writing Informational Reports • Writing Recommendation Reports 			15
Unit III: Reviewing and Innovation management <ul style="list-style-type: none"> • Reviewing • Innovation management 			15

Evaluation Scheme

Evaluation will be based on External and Internal examination in the ratio of 60:40 (External 60% weightage and Internal 40% weightage)

External:

Theory Examination: Suggested Format of Question paper *

Duration: 3 Hours

Total Marks: 100

- All questions are compulsory

Q. 1	Based on Unit I	15
	OR	
Q. 1	Based on Unit I	15
Q. 2	Based on Unit II	15
	OR	
Q. 2	Based on Unit II	15
Q. 3	Based on Unit III	15
	OR	
Q. 3	Based on Unit III	15
Q. 4	Based on Unit I, II, III	15
	OR	
Q. 4	Based on Unit I, II, III	15

- The pattern may differ if we have to conduct on line examination depending on the situation

Each question may consist of sub-questions of following types

Full length question,	15 Marks
Short answer question	10 Marks
Short note questions	5 Marks
Objectives	2 Marks

Internal Examination: The internal examination will consist of various assignments which will include presentation of given topic, seminar on given topic, writing the given assignment, attending and reporting seminars and conferences, field experience. And many such types.

There will be minimum one assignment on each unit of each course (Thus total minimum 12 assignments) which need to be submitted in the given time limit. Each assignment will be of 10 marks and total marks of assignments will be converted to 40% marks.

Total marks of Theory Examination:

Course Code	Maximum marks		
	External	Internal	Total
ASCDAT1	60	40	100
ASCDAT2	60	40	100
ASCDAT3	60	40	100
ASCDAT4	60	40	100
TOTAL			400

Practical Examination:

Course Code	Details	Practical	Journal	Viva	Total
ASCDAP1	Practical- I	80	10	10	100
ASCDAP2	Practical- II	80	10	10	100
ASCDAP3	Practical III	80	10	10	100
TOTAL					300

Total of Theory Examination**400 Marks****Total of Practical Examination****300 Marks****Grand Total****700 Marks**

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