MAHARSHI DAYANAND UNIVERSITY, ROHTAK
DEPARTMENT OF STATISTICS
(w.e.f. Session 2020-21)

Program: One Year Diploma in 'Data Analytics'

Program Specific Outcomes

1. Acquired knowledge and skills for applying statistical methods and modelling techniques to real life problems and their solutions.
2. Achieved practical experience for applying computational techniques using statistical software SPSS, R, Python and SQL.
3. Developed the programming skill.
4. Acquired ability to demonstrate proficiency with statistical analysis and management of data.
5. Acquainted with the applications of the principles and techniques of database design, administration, and implementation to enhance data collection capabilities and decision-support systems.
6. Gained knowledge to articulate assumptions, analyses, and interpretations of data.

Scheme of the Examinations

The duration of the program shall be one year (Two Semesters). There will be three (03) theory and three (03) practical papers in 1st Semester. In 2nd Semester, there will be three (03) theory and two (02) practical papers. There will be one paper of Project Work Report in 2nd Semester. The detailed scheme of examinations for the program is as follows:

Semester I

Course Code	Title of Paper	Theory Marks	Internal Assessment	Total Marks	Time Allowed	Credits
20DPDA11C1	Statistical Methods & Testing of Hypothesis	80	20	100	03 Hrs	04
20DPDA11C2	Sampling Techniques & Applied Statistics	80	20	100	03 Hrs	04
20DPDA11C3	DBMS & SQL	80	20	100	03 Hrs	04
20DPDA11CL1	Practical Based on paper 20DPDA11C1	100	-	100	03 Hrs	04
20DPDA11CL2	Practical Based on paper 20DPDA11C2	50	-	50	02 Hrs	02
20DPDA11CL3	Practical Based on paper 20DPDA11C3	50	-	50	02 Hrs	02

Semester 2

Course Code	Title of Paper	Theory Marks	Internal Assessment	Total Marks	Time Allowed	Credits
20DPDA12C1	Multivariate Analysis & Regression Models	80	20	100	03 Hrs	04
20DPDA12C2	Programming with Python	80	20	100	03 Hrs	04
20DPDA12C3	Data Analysis Using R	80	20	100	03 Hrs	04
20DPDA12CL1	Practical Based on paper 20DPDA12C1 & 20DPDA12C3	50	-	50	02 Hrs	02
20DPDA12CL2	Practical Based on paper 20DPDA12C2	50	-	50	02 Hrs	02
20DPDA12C4	Project Work*	100+50(Viva-Voce)	-	150	-	04

***Project Work:** The project work will start in the beginning of 2nd semester under the approved supervisors from amongst faculty members of the department. The student will be required to submit the project work within one month after the theory papers of 2nd semester. The evaluation will be done jointly by the internal examiner and external examiner on the basis of project work report and viva-voce. In case the supervisor of the student(s) shows his/her inability to act as internal examiner, the Head of the Department will work as internal examiner.

Semester 1
20DPDA11C1 (Statistical Methods & Testing of Hypothesis)

Maximum Marks-80
Internal Assessment Marks-20
Time:-03 Hours
Teaching Hours: 04 hrs per week
Credits: 04

Course Objectives

- Awareness of different types of data sets and their presentation including statistical measures.
- Use of Correlation & regression and Principle of least squares to fit the data.
- Foundation of probability theory and statistical modelling of outcomes of real life random experiments through various probability distributions.
- To make an individual understand basic theoretical knowledge about fundamentals of hypothesis testing.
- To provide a systematic account of Neyman Pearson theory of testing, point & interval estimation and non-parametric tests together with their applications.

Course Specific Outcomes

- Acquired knowledge to understand presentation and interpretation of the data.
- Able to understand measures of central tendencies and dispersions, correlation and regression analysis.
- Achieved knowledge to understand Probability Distributions.
- Ability to estimate unknown parameters of a given probability distribution.
- Acquired knowledge to test simple and composite hypothesis.
- Familiar with methods of obtaining confidence interval.
- Gained understanding about the non-parametric tests.

Section-I

Basic Statistics: Presentation of Data, Measures of Central Tendencies and Dispersions, Skewness and Kurtosis. Analysis and Consistency of Categorical Data, Fitting of Curves. Correlation and Regression.

Section-II

Probability and Probability Distributions: Baye's Theorem, Random Variables (One and Two Dimensional) and Probability Functions, Mathematical Expectation and its Properties, Generating Functions and their Properties. Discrete & Continuous Probability Distributions, Weak & Strong Law of large numbers.

Section-III

Statistical Estimation: Standard Error, Point Estimation, Characteristics of a Good Estimator, Methods of Estimation: Method of Moments and Maximum likelihood. Testing of Hypotheses: Null and Alternative Hypotheses. Simple and Composite Hypotheses, Critical Region, Level of Significance, One Tailed and two Tailed Testing, Types of Errors, Neyman- Pearson Lemma.

Section-IV

Interval Estimation: Method of Obtaining Confidence Intervals Based on Small and Large Samples. Unbiased and Shortest Expected Length of Confidence Interval, Small and Large Sample Tests. Non-Parametric Tests, Analysis of Variance for One- Way, Two -Way With One/m Observations Per Cell for Fixed, Mixed and Random Effects Models.

Books Suggested: -

1. Goon, A.M., Gupta, M.K., and B. Das Gupta: Fundamentals of Statistics, Vol-I.
2. Mukhopadhayaya, P.: Mathematical Statistics.
3. Hogg, R.V. & A.T. Craig: Introduction to Mathematical Statistics.
4. Meyer, P.L.: Introductory Probability and Statistical Applications
5. Freund, J.E.: Mathematical Statistics.
6. Rohatgi, V. K. and Saleh, A.K. Md. E.: An Introduction to Probability and Statistics
7. Rao, C .R. : Linear Statistical Inference and its applications
8. Goon, A.M., Gupta, M.K., and B. Das Gupta : Outline of Statistical Theory Vol. II

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA11C2 (Sampling Techniques and Applied Statistics)

Maximum Marks-80
Internal Assessment Marks-20
Time:-03 Hours
Teaching Hours: 04 hrs per week
Credits: 04

Course Objectives

- To understand time series modelling and the concept of forecasting and future plans.
- To introduce the most important field of applied statistics that contributes to quality control in almost all industries.
- To enhance the knowledge about the data that deals with the laws of human mortality, morbidity and demography.
- To make the study about the implementation of various sampling schemes along with their merits, demerits and comparisons in appropriate practical situations.

Course Specific Outcomes

- Achieved knowledge about the use of time series in forecasting and economic analysis.
- Able to understand of manufacturing process and specification limits.
- Be familiar with the sources of vital statistics data and how birth rate, mortality rate and reproduction rate are calculated and interpreted.
- Ability to understand techniques for conducting Sample Surveys.
- Understand the different sampling schemes (stratified sampling, cluster sampling, multi-stage and multi-phase sampling).

Section-I

Concepts of Census and Sample Surveys: Basic Concepts in Sampling, Sampling and Non-Sampling Errors. Principal steps involved in a Sample Survey, Bias, Precision, Accuracy and Mean Squared Error, Some Basic Sampling Methods- Probability and Purposive Sampling, Simple Random Sampling (SRS), Stratified Sampling, Systematic Random Sampling, Double Sampling (Two Phase Sampling), Single Stage Cluster Sampling, Two Stage Sampling.

Section-II

Time Series Analysis: Components of Time Series, Additive and Multiplicative Models, Measurement of components of time series, Concept of Stationary Time Series(Strong and Weak Stationary), Box Jenkin's Models, ARIMA Models, Forecasting: Exponential and Adaptive Smoothing Models.

Section-III

Statistical Quality Control: Definition, purposes, 3-Sigma Control Limits, Shewart Control Chart. Control Charts For Variables and Attributes, Natural Tolerance & Specification Limits: Modified Control Limits. Sampling Inspection Plan, Producer's and Consumer's Risk OC and ASN Function, AQL, LTPD and ATI. The Single, Double and Sequential Sampling Plans and Their Curves viz AOQ, OC, ASN and ATI Curves. The Choice of Sampling Plans by Attributes and by Variables. Acceptance Plan by Variables (Known and Unknown Sigma Case).

Section-IV

Demographic Methods: Sources of Demographic Data, Measurement of Mortality- Crude Death Rate, Specific Death Rate, Standardized Death Rates. Complete Life Tables and its main Features, Assumptions, Descriptions and Construction of Life Tables, Uses of Life Tables, Abridged Life Table using King's Method, Stationary and Stable Population. Measurement of Fertility-Crude Birth Rate, General Fertility Rate, Specific Fertility Rate, Total Fertility Rate. Measurement of Population Growth-Gross Reproduction Rate, Net Reproduction Rate.

Books Suggested: -

1. Goon, A.M., Gupta, M.K., and B. Das Gupta: Fundamentals of Statistics, Vol-II.
2. Daroga Singh & F.S. Chaudhary: Theory & Analysis of Sample Surveys
3. Gupta, S.C. & Kapoor, V.K. : Fundamentals of Applied Statistics
4. Croxton, F.E & Cowdon, D.J. : Applied General Statistics
5. Mukhopadhyay,Primal : Theory and Methods of Survey Sampling
6. P.V.Sukhatme & B.V.Sukhatme : Theory and application of Sample Survey
7. M.G.Kindall : Time Series

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA11C3 (DBMS & SQL)

Maximum Marks-80

Internal Assessment Marks-20

Time:-03 Hours

Teaching Hours: 04 hrs per week

Credits: 04

Course Objectives

- To present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.
- To study of information concepts and the realization of those concepts using the relational data model.
- To gain practical experience of designing and constructing data models and using SQL to interface to user DBMS packages.
- To enhance the knowledge of advanced concepts such as logical data, parallel & distributed database and warehousing and data mining.

Course Specific Outcomes

- Able to differentiate database systems from file systems by enumerating the features provided by database systems.
- Acquired skill to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
- Able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
- Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
- Use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain and query a database.

Section-I

Basic Concepts of DBMS, Data Abstraction, Data Independence, Data Aggregation, Three tier architecture, E-R Diagram(Entity Relationship), Mapping Constraints, Keys, Reduction of E-R diagram into tables.

Section-II

Relational data base: Relational algebra, Tuple and domain relational calculus, Armstrong's axioms, Normal forms, Functional Dependency, Lossless Design SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

Section-III

File Organization: Sequential Files, Index sequential files, direct files, Hashing, B-trees, B+ trees, Index files.

Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

Section-IV

Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

Advanced topics: Parallel and distributed data base, Object oriented and object relational databases, Logical databases, Web databases, Data warehousing and data mining.

Books Suggested:

1. Silberschatz, A., Korth, H.F., & Sudarshan, S.: Database System Concepts
2. Elmasri, R. & Navathe, S.B.: Fundamentals of Database Systems
3. Date, C. & Darwen, H.: A guide to SQL Standard
4. Majumdar, A.K. & Bhattacharya, P.: Database Management Systems
5. Hansen, G.W. & J.V.: Database Management and Design

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA11CL1-Practicals (Based on 20DPDA11C1)

Paper Code: 20DPDA11CL1
Paper: Practical's (Statistical Methods & Testing of Hypothesis - 20DPDA11C1**)**
Course Outcomes

- Able to understand methods for presentation of the data.
- Acquired knowledge to carry out correlation and regression analysis.
- Enhanced knowledge to understand the situations where measures of central tendencies and dispersions are to be used.
- Able to understand fitting of the probability distributions to the real data.
- Ability to find out confidence interval and best critical region for practical problems.
- Ability to analyze the demographic data, economic data etc.

20DPDA11CL2-Practicals (Based on 20DDA11C2)

Paper Code: 20DPDA11CL2
Paper: Practical's (Sampling Techniques & Applied Statistics - 20DPDA11C2**)**
Course Outcomes

- Ability to analyze the demographic data, economic data etc.
- Ability to make complete and abridged life tables.
- Acquainted with Sample Surveys methods.
- Gained knowledge to understand different sampling schemes and their applications.

20DPDA11CL3-Practicals (Based on 20DPDA11C3)

Paper Code: 20DPDA11CL3
Paper: Practical's (DBMS & SQL -20DPDA11C3**)**
Course Outcomes

- Ability to know the practical knowledge of Database Management System, Transaction Queries etc. using Computer Software.
- Gained the knowledge of SQL and ORACLE Software.
- Acquired the practical experience of designing and constructing data models.
- Acquainted with the use of an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain and query a database.

Note: The practical paper will be of 02 hours and each question paper will consist of five questions based on the entire syllabus. The students will be required to attempt any three questions. The question paper will set on the spot jointly by internal and external examiners.

Distribution of marks is as follows:

Marks for Question Paper	36
Marks for Practical's Record Book	06
Marks for Viva-Voce	08
Total	50

SEMESTER- 2

20DPDA12C1 (Multivariate Analysis & Regression Models)

Maximum Marks-80

Internal Assessment Marks-20

Time:-03 Hours

Teaching Hours: 04 hrs per week

Credits: 04

Course Objectives

- To introduce the concept of analysing multivariate data and to increase familiarity with the handling of multivariate data.
- To study Fisher's Discriminant Function, Mahalanobis' Distance and Principal Components.
- To enhance the knowledge of linear regression models and PRESS statistics.
- To enhance the knowledge about decision theory and optimal rules.
- To expose the advanced concepts – linear restrictions on regression coefficients, computational techniques for model selection etc.

Course Specific Outcomes

- Able to handle multivariate data with Normal distribution.
- Acquired knowledge to analyze multivariate data with given mean vector.
- Able to understand testing hypotheses for mean correlation and regression coefficients.
- Gained knowledge to find major factors and the variability using multivariate techniques of principal component, factor analysis, discriminant function and clustering analysis.

Section-I

Multivariate Linear Regression Models: Estimation of parameters and their properties. Distribution of the Matrix of Sample Regression Coefficients and Tests of Linear Hypothesis about Regression Coefficients. One way Multivariate Analysis of Variance [MANOVA], Wilk's Lambda Criterion, Likelihood Ratio Test Criteria for testing Independence of Sets of Variables.

Section-II

Likelihood Ratio Criteria for Testing Equality of Covariance Matrices and Identity of Several Multivariate Normal Populations, Fisher's Discriminant Function, Mahalanobis' Distance, Principal Components, its Uses and Importance, Canonical Variables and Canonical Correlations.

Section-III

Linear Regression Models: For Two Variables, The General Linear Regression Model, R^2 and adjusted R^2, Model Adequacy Checking- Residual Analysis, Methods of scaling residuals- Standardized and studentized residual, PRESS, Residual Plots, PRESS Statistics, Variance Stabilizing Transformations. Generalized and Weighted Least Squares, Diagnostics for Leverage and Influence, Variable Selection and Model building.

Section-IV

Tests of Linear Restrictions on Regression Coefficients, Use of Extraneous Information on Regression Coefficients – Restricted Regression, Restricted Least Squares and Its Properties, Mixed Regression and Properties of Mixed Regression Estimator, Specification Errors Analysis- Inclusion and Deletion

of Explanatory Variables, Effect On Estimation of Parameters and Disturbance Variance, Computational Techniques for Model Selection-Mallow's C_p, Stepwise Regression, Logistics and Poisson Regressions.

Books Suggested:-

1. Anderson, T.W. : An Introduction to Multivariate Statistical Analysis
2. Johnson, R. A. and Wichern, D. W. : Applied Multivariate Statistical Analysis
3. Johnston, J. : Econometric Methods
4. Damodar N. Gujarati : Basic Econometrics
5. Montgomery, D.C. Peck and Vining, G.G. : Introduction to Linear Regression Analysis
6. Draper, N.R. and Smith, H. : Applied Regression Analysis

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA12C2 (Programming with Python)

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Teaching Hours: 04 hrs per week
Credits: 04

Course Objectives

- To understand the fundamental ideas in computer science.
- To introduce the concept of programming code in data analysis.
- To study list, dictionary and design with functions.
- Advancement with data modelling.

Course Specific Outcomes

- Able to understand the syntax of the programming.
- Acquired knowledge to create and read the formatted files.
- Ability to handle the redundancy complexity.
- Achieved the knowledge of OOP used in data modelling.

Section-I

Introduction: Fundamental ideas in computer science; modern computer systems, installing Python; basic syntax, interactive shell, editing, saving, and running a script; The concept of data types; variables, assignments; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages; Control statements: if-else, loops (for, while)

Section-II

Strings, text files: String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated).

Section-III

Lists, dictionary and Design with functions: Basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding, and removing keys, accessing and replacing values; traversing dictionaries. Hiding redundancy, complexity; arguments and return values; Program structure and design. Recursive functions.

Section-IV

Object Oriented concepts: Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modelling; persistent storage of objects, Inheritance, polymorphism.

Books Suggested:

1. Kenneth Lambert: Fundamental of Python- First Program
2. Charles Dierbach : Introduction to Computer Science Using Python
3. Martin C. Brown : Python The Complete Reference
4. Yashavant Kanetkar : Let Us Python

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA12C3 (Data Analysis Using R)

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Teaching Hours: 04 hrs per week
Credits: 04

Course Objectives

- To provide a basic understanding of R software.
- To understand the statistical methods using R functions.
- To learn the various plotting functions in R graphics.
- To study the regression analysis and simulation applications in R.

Course Specific Outcomes

- Able to use advanced Statistical Software such as R, S-Plus, SPSS, etc for the analysis of complex Statistical Data coming from the various fields like industry, marketing, finance, agriculture and business.
- Improved the programming skill and working knowledge of available numerical and Statistical software.
- Gained expertise in handling data through R Language.
- Achieved knowledge to understand the applications of R Programming in Statistics.

Section-I

Introduction & Data Handling in R: Introduction to the Statistical Software R, Introduction to R Studio and dynamic documentation, Data Objects in R, Creating Vectors, Creating Matrices, Data Frame, Manipulating Data, Accessing Elements of a Vector or Matrix, Lists, Addition, Multiplication, Subtraction, Transpose, Inverse of Matrices. Functions operated on Data Objects. Merging of two or more Data Frames, Importing Data, Read and Write Files. Boolean Operators. Handling of Missing and Duplicated Cases/ Observations. Writing own Functions.

Section-II

R-Graphics: Types of Plotting Functions and their Applications. Histogram, Boxplot Steam and Leaf Plot, Scatter Plot, Matplot, Introduction to ggplot. Plot Options: Multiple Plots in a single Graphic Window, Adjusting Graphical Parameters. Looping: For Loop, repeat Loop, while Loop, If command, if else command.

Section-III

Statistical Method: Univariate and Multivariate Statistics; Mean, Median, Variance, Coveriance, Correlation, Distribution functions in R, Maximum likelihood Estimation using R-funtions. Model fitting, Parametric and Non-Parametric Tests, Chi-square Tests: goodness of fit, Contingency Tables, Nomality Test in R.

Section-1V

Analysis of Variance (ANOVA): Factor Variables, ANOVA table, Multiple comparisons; Simple and Multiple Linear Regression Analysis, Generalized Linear Model: Logistic and Poisson Regressions, A Simulation Application: Monte Carlo Integration, Random Sampling, Bootstrapping.

Books Suggested:-

1. Sandip Rakshi : Statistics with R Programming
2. Garrett Grolemund : Hands on Programming with R
3. Andrie de Vries and Joris Meys R for Dummies
4. Jared P. Lander : R for Everyone (2nd Edition)
5. K.G. Srinivasa, G.M. Siddesh : Statistical Programming in R
6. Dr. Dhaval Maheta : Statistical Analysis using R Software
7. W. John Braun and Duncan J. Murdoch: A First Course in Statistical Programming with R
8. Hadley Wickham: Advanced R
9. Yihui Xie : Dynamic Documents with R and knitr
10. Christopher Gandrud: Reproducible Research with R and R Studio

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, there will be two questions of 16 marks each from sections I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

20DPDA11CL3-Practicals (Based on 20DPDA12C1 & 20DPDA12C3)

Paper Code: 20DPDA11CL3
Paper: Practical's (Multivariate Analysis & Regression Models and Data Analysis Using R - 20DPDA12C1 & 20DPDA12C3**)**
Course Outcomes

- Able to extend the Univariate techniques to multivariate framework using SPSS.
- Ability to find the estimate of population mean vector and dispersion matrix for multivariate normal distribution.
- Ability to select variable and to build the model.
- Gained the knowledge of Computational Techniques for Model Selection.
- Able to analyze the data using Statistical Software R.
- Gained expertise in plotting the data by R- Graphics.
- Achieved knowledge to understand the applications of R in parametric and non-parametric tests.
- Acquainted with the practical knowledge of ANOVA, Regression analysis and Bootstrapping methods in R.

20DPDA11CL4-Practicals (Based on 20DPDA12C2)

Paper Code: 20DPDA11CL4
Paper: Practical's (Programming with Python -20DPDA12C2**)**
Course Outcomes

- Able to analyze the data using Python.
- Acquired knowledge to create and read the formatted files in Python.
- Ability to handle the redundancy complexity in data.
- Achieved the practical knowledge of OOP used in data modelling.

Note: The practical paper will be of 02 Hours and each question paper will consist of five questions based on the entire syllabus. The students will be required to attempt any three questions. The question paper will set on the spot jointly by internal and external examiners.
Distribution of marks is as follows:

Marks for Question Paper	36
Marks for Practical's Record Book	06
Marks for Viva-Voce	08
Total	50

20DPDA12C4- Project Work

Paper Code: 20DPDA12C4

Each student of the program (PG Diploma) will have to submit a project report under the supervision of the faculty member of the Department. The project work shall involve handling data extensively and use of methodologies (including Statistical Software) learnt during the program to derive meaningful inferences.
Distribution of marks for the Project Work is as follows:

Marks for Project Report Evaluation	100
Marks for Viva-Voce	50
Total	150