Post Graduate Diploma in Data Analysis

GUJARAT UNIVERSITY

DEPARTMENT OF BUSINESS INTELLIGENCE

B.K.SCHOOL OF PROFESSIONAL AND MANAGEMENT STUDIES

(Effective from academic year 2020-21)

Department of Business Intelligence offers short term courses of one year Post Graduate Diploma Programmes. The target of the programmes is those persons who want to increase their employability or improve their professional skills but did not have the opportunity to do so earlier in a formal manner. The focus of the programmes will be to impart the required knowledge and skills. These programmes will be conducted during the evening hours so that employed persons or students pursuing other programmes can also join without affecting their normal pursuits. In other words, even Post Graduate students pursuing other full time programmes can also join any of these programmes.

P. G. Diploma Courses

1. Post graduate diploma in Business Analysis
2. Post Graduate Diploma in Multivariate Statistical Analysis and Structural Equation Modelling

In-take : The minimum intake will be 10 and the maximum number will be 30 students per course.

No of Papers : 4

Credit :16 (Each Paper have 4 credit)

Duration : One year

Eligibility : Minimum graduation in any discipline (Students pursuing any part time or

full time programme after their graduation/employed persons who are graduates).

One participant can undergo only one programme at a time.

Fees: Rs. 20,000/- to be paid at the time of admission.

Examination fees - Rs. 575/- would be paid to the University separately for each university exam

Timings : Two hours per day, two-three days a week (7:00 pm to 9:00 pm)

Reservation : As per Gujarat University rules Examination Pattern : Internal

Examination: 20% (Two hours)

Continuous evaluation: 30% (Quizzes, Presentation, Attendance Assignments and Project)

Sr. No.	Course Code	Semester-I	Credit
1	DA-101	**Business Research & Analytics (BRA)**	4
2	DA-102	**Foundation of Data Management in R (FDM)**	4
Sr. No.	**Course Code**	**Semester-II**	**Credit**
3	DA-103	**Data Analysis using SPSS (DA_SPSS)**	4
4	DA-104	**Dissertation Project Report (DPR)**	4
Total			16

P.G. IN DIPLOMA COURSE IN DATA ANALYSIS

Paper I- Business Research & Analytics (BRA)

1. Course Objective

The objective of the course is to familiarize students with the types of business problems often faced by corporate entities and to help them develop insights about basic concepts of research designs and methodology aimed at solving business problems.

2. Course Content

Introduction to Research

Meaning of research; Types of research- Exploratory research, Conclusive research; The process of research;

Research Problem and Formulation of Research Hypotheses: Defining the Research problem; Problem identification process; Components of the research problem; Formulating the research hypothesis- Types of Research hypothesis; Writing a research proposal- Contents of a research proposal and types of research proposals.

Research Design

Meaning of Research Designs; Nature and Classification of Research Designs; Exploratory Research Designs: Secondary Resource analysis, Case study Method, Expert opinion survey, Focus group discussions; Descriptive Research Designs: Cross-sectional studies and Longitudinal studies; Experimental Designs, Errors affecting Research Design.

Primary and Secondary Data: Primary Data Collection: Observation method, Focus Group Discussion, Personal Interview method.

Attitude Measurement and Scaling and Sampling

Types of Measurement Scales; Attitude; Classification of Scales: Single item vs. Multiple Item scale, Comparative vs. Non-Comparative scales, Measurement Error, Criteria for Good Measurement.

Questionnaire Design:

Sampling

Sampling concepts- Sample vs Census, Sampling vs Non Sampling error; Sampling Design- Probability and Non Probability Sampling design;

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Report writing

3. Teaching Methods

The course will use the following pedagogical tools:

(a) Case discussion covering a cross section of decision situations.

(b) Discussions on issues and techniques of business research.

(c) Projects/ Assignments/ Quizzes/ Class participation etc.

4. Evaluation

The evaluation of participants will be on continuous basis comprising following elements:

A	Projects/ Assignments/ Quizzes/ Class participation etc.	Weight-age 30% (Internal & Continuous Evaluation)
B	Mid-Semester examination	Weight-age 20 % (Internal Evaluation)
C	End –Semester Examination	Weight-age 50% (External Evaluations)

5. Basic Textbooks (Latest Edition)

Sr. No.	Author/s	Name of the Book	Publisher	Edition and Year of Publication
T1	Donald R. Cooper and Pamela S. Schindler	Business Research Methods (IX edition)	Tata McGraw Hill Publishing Company Ltd., New Delhi	IX edition
T2	Zikmund Willium	Business Research Methods,	Thompson Learning	(2003) 8th edition

6. Reference Books

Sr. No.	Author/s	Name of the Book	Publisher	Edition and Year of Publication
R1	D. K. Bhattacharyya	Research Methodology	Excel Books	2nd Edition or later
R2	Bryman Alan	Business Research Methods	Oxford University Press	(2006) 8th edition
R3	Panneerselvam R,	Research Methods for Business	John Wiley & Sons	(2004) 4th edition
R4	K. Aswathappa and K. Shridhara Bhat	Research Methodology	Prentice Hall of India	Latest Edition
R5	Alan Bryman, Emma Bell	Business Research Methods	Oxford Press	2nd Edition,

7. List of Journals/Periodicals/ Magazines/ Newspapers etc.

- Journal of Business Research
- Electronic Journal of Business Research Methods
- Jindal Journal of Business Research
- Review of Business Research
- Vikalpa,
- Decision etc.

Paper II- Foundation of Data Management in R (FDM)

1. Course Objective

This is an introductory course on how to use the R programming language and software environment for data manipulations and munging, exploratory data analysis and data visualizations.

Learning outcomes Students will be familiar to the R ecosystem and learn how to use R for the most common data analysis tasks, including loading, cleaning, transforming, summarizing and visualizing data.

2. Course Contents

Module No.	Modules/Sub-Modules
	General Introduction into the R Ecosystem Downloading and installing R, History of R, R packages, CRAN, Demonstration of a Data Analysis Project, Brief Overview on R Coding Tools, RStudio, git, GitHub, Constants, operators, functions, variables Random numbers, Vectors and vector indexing, Simple descriptive stats Loops, Conditional expressions, Applying PCA on an image for outlier-detection, Visualizing MDS on a distance matrix
	Brief Overview on R Coding Tools A Systematic Introduction into Data Types, Levels of measurement (nominal, ordinal, interval, ratio scale), Vector types, data frame objects, rows and columns, indexing, Characteristics of tidy data
	Basic Data Transformations Create new variables in a data.frame, Filter rows and columns, Merging datasets. Introduction to data.table for More Complex Data Transformations. Filtering and ordering data, Summaries and aggregates New variables, Relational data, Joins on Keys, Introduction into fuzzy joins, Transforming wide and long tables.
	EDA - Univariate Descriptive Statistics + crosstabs + correlation + ANOVA, EDA - First Steps with Data Visualization: Why not Use Pie Charts, Plots outside of Excel: dotchart and violinplot examples, The Grammar of Graphics in R with ggplot2,Using labels for variable names

Introduction to Non-tabular Data Types: Time-series, Spatial data Network data

Data Transformations: Converting Numeric Variables into Factors, Data Operations, String Parsing, Geocoding, Dirty Data Problems: missing values, data imputation, duplicates

Introduction to R- studio, All univariate, bi-variate and other statistical test using R software.

3. Teaching Methods

The course will use the following pedagogical tools:

(a) Lectures and case discussion covering a cross section of decision situations.
(b) Discussions on issues and techniques
(c) Projects/ Assignments/ Quizzes/ Class participation etc
(d) Hands on practical experience

4. Evaluation

The evaluation of participants will be on continuous basis comprising following elements:

A	Projects/ Assignments/ Quizzes/ Class participation etc.	Weight-age 30% (Internal & Continuous Evaluation)
B	Mid-Semester examination	Weight-age 20 % (Internal Evaluation)
C	End –Semester Examination	Weight-age 50% (External Evaluation,) **Project based university exam**

5. Text Books

Sr. No.	Author/s	Name of the Book	Publisher
T1	Dr Mark Gardener	Beginning R - The Statistical Programming Language	Wrox 2012
T2	Dr. Rob Kabacoff	R in Action: Data Analysis and Graphics with R	Manning Publications 2015

6. Reference Books

Sr. No.	Author/s	Name of the Book	Publisher

R1	Dr Mark Gardener	*Community Ecology: Methods of analysis using R and Excel*	Ingram short title 2014
R2	*Garrett Grolemund*	Hands-On Programming with R	O'Reilly 2014
R3	Hadley Wickham	R for Data Science: Import, Tidy, Transform, Visualize, and Model Data	Shroff/O'Reilly 2017

7. List of Journals/Periodicals/ Magazines/ Newspapers etc.

1. International Journal of Big Data Management
2. International Journal of Information Management
3. International journal of data mining, modelling and management
4. Analytics India – Magazine

Paper III- Data Analysis using SPSS (DA_SPSS)

1. Course Objective

The objective of this course is to equip the students with conceptual understanding of main features of SPSS. Students are expected to solve a large number of numerical and other assignments, which would be the preparatory requirements of this course. Students are expected to use the SPSS GUI effectively, perform descriptive analyses with SPSS, perform common parametric and non-parametric tests, perform simple regressions and multivariate analyses (factor and cluster).

2. Course Contents

Introduction to SPSS

Data View And Variable View), Measurement Scales, How To Export Data From Excel To Software, Entering, Saving And Printing Data, Viewing A Few Cases, Merge File With Cases, Merge File With Variables, Sort Cases, Spilt File, Select Cases, How To Do Serial Number, Recode Into Same Variable, Recode Into Different Variable, Compute Command, Visual Binning, Generation Of Shell File.

Descriptive Statistics

Tables And Graphs for One Variable, Tables And Graphs for Two Variables, One Variable Descriptive Statistics, Two Variables Descriptive Statistics, Measures Of Central Tendency And Variability

One - Sample Hypothesis Tests, Two- Sample Hypothesis Tests

The Logic of Hypothesis testing, One-Sample T-Test, The Logic of Hypothesis Testing, Paired vs. Independent Samples, Testing Assumptions of Independent Samples, Normal Populations, Randomness of Data and Equal population Variance, Comparing Three or More Means, Testing Assumptions of Independent Samples, Normal Populations and Homogeneity Population Variance, One- Factor Independent Measures ANOVA, Post Hoc Multiple Comparisons, Family of Anova (all test like Two way ANOVA, ANCOVA, MANOVA: one way & two way, MANCOVA etc…)

Univariate, bivariate, Multivariate analysis techniques

Parametric and Nonparametric Methods

Introduction to Parametric and Nonparametric Methods, Mann-Whitney U test, Wilcoxon Signed Ranks Test, Kruskal- Wallis H Test, Spearman's Rank Order Correlation, Sign Test, Runs Test, One Sample Chi Square Test, Fridman One-Way Anova, Kolmogorov- Smirnov One Sample Test.

Analysis using dependence technique: Simple and Multiple regression, correlation

Conjoint analysis, Multiple Discriminant analysis and logistic regression

Cluster Analysis

Factor analysis: CFA and EFA.

What is FA, Hypothetical example of FA, Assumptions of FA, Deriving factors and assessing overall fit, interpreting the factors, Validation of factors analysis, Structural Equation Modelling

SEM in AMOS and Smart PLS

3. Teaching Methods

The course will use the following pedagogical tools:

(a) Discussions on issues & techniques and selected cases covering major financial management decisions.

(b) Solving of Selected Numerical

(c) Projects/Assignments/Quizzes

4. Evaluation

The evaluation of participants will be on continuous basis comprising following elements:

A	Projects/ Assignments/ Quizzes/ Class participation etc.	Weight-age 30% (Internal & Continuous Evaluation)
B	Mid-Semester examination	Weight-age 20 % (Internal Evaluation)
C	End –Semester Examination	Weight-age 50% (External Evaluations)

5. Text Books

Sr. No.	Author/s	Name of the Book	Publisher
T1	Keith McCormick, Jesus Salcedo, Jon Peck (With), Andrew Wheeler (With), Jason Verlen	SPSS Statistics for Data Analysis and Visualization	Wiley Publication

6. Reference Books

Sr. No.	Author/s	Name of the Book	Publisher
R1	Andy Field	Discovering Statistics using SPSS	Sage Publication

Paper -IV Dissertation Project Report

Course Objective

The objective of this course is to prepare the students to conduct a study of an Industry/organization utilizing the tools and techniques learned in the programme.

The focus of the study could be an in depth analysis of an industry and within the industry study of an organization as a case study. The emphasis is on macro and micro level study of issues/problems. Alternatively, if an organization has a problem, its diagnosis and solution in the form of an analytical analysis or model building could be considered which can be implemented. The project study could also be carried out as a comparative analysis of the same industry in different countries, if feasible.

The project should have substantial and primary data. The student is expected to conduct a detailed survey of literature/analysis of secondary and primary data. In case of a status report of an industry, it is expected that the student collects all aspects related to a particular industry analyze data and present the findings.

Prior to conduct of the study, a student in required to prepare a short research proposal of the study recommendations and it is also expected that the study would lead to recommendation and implementable plans of action.

2. Types of Projects

1. Comprehensive case study of Industry.
2. Organizational study aimed at inter-organizational comparison / validation of theory /survey of management practices.
3. Field study (empirical study) with respect to any research issue.
   (Feasibility studies as project are not acceptable)

3. Expected format for preparation of the proposal

- Introduction and Statement of Problem

- Short Literature Survey
- Research Design & Hypothesis, if any
- Research Methodology
- Data Sources
- Time Budget
- Tentative Chapter Plan
- Expected Contribution of the study
- Beneficiaries
- A short write up on the researcher
- Bibliography/Appendices, if any

4. Report Framework

- Initial pages
- Executive summary
- Introduction/statement of problem
- Detailed survey of literature
- Methodology / Focus / Scope / Limitations
- Text of the study including analysis
- Conclusions and Recommendations including plan of action
- Bibliography
- Appendices

5. Format of Presentation

1. The student in expected to follow the required style for presentation of the report including Tables, References, Bibliography and Appendices.

2. Literature Survey should be related to the problem of study. Review of the studies in the area and critical examination of them including conclusions of the student should form part of the literature survey.

3. Acknowledgement of all sources of information through footnoting and biography is an essential requirement of the study.