

Heurexler Research Pvt. Ltd.

in association with

Gyan Bharti Institute of Technology

offers

6 Months Diploma in Business Analytics Using SPSS

**Syllabus (Course code: Advanced- SPSS)**

**Unit 1: Developing the familiarity with SPSS Processor**

Entering data in SPSS editor. Solving the compatibility issues with different types of file. Inserting and defining variables and cases. Managing fonts and labels. Data screening and cleaning. Missing Value Analysis. Sorting, Transposing, Restructuring, Splitting, and Merging. Compute & Recode functions. Visual Binning & Optimal Binning. Research with SPSS (random number generation).

**Unit 2: Working with descriptive statistics**

Frequency tables, Using frequency tables for analyzing qualitative data, Explore, Graphical representation of statistical data: histogram (simple vs. clustered), boxplot, line charts, scattorplot (simple, grouped, matrix, drop-line), P-P plots, Q-Q plots, Addressing conditionalities and errors, computing standard scores using SPSS.

**Unit 3: Hypothesis Testing**

Sample & Population, concept of confidence interval, Testing normality assumption in SPSS, Testing for Skewness and Kurtosis, Kolmogorov–Smirnov test, Test for outliers: Mahalanobis Test, Dealing with the non-normal data, testing for homoscedasticity (Levene's test) and multicollinearity.

**Unit 4: Testing the differences between group means**

t – test (one sample, independent- sample, paired sample), ANOVA-GLM 1 (one way), Post-hoc analysis,

## **Unit 5: Correlational Analysis**

Data entry for correlational analysis, Choice of a suitable correlational coefficient: non-parametric correlation (Kendall's tau), Parametric correlation (Pearson's, Spearman's), Special correlation (Biserial, Point-biserial), Partial and Distance Correlation

## **Unit 6: Regression**

The method of Least Squares, Linear modeling, Assessing the goodness of fit, Simple regression, Multiple regression (sum of squares, R and  $R^2$ , hierarchical, step-wise), Choosing a method based on your research objectives, checking the accuracy of regression model. Logistic regression,

## **Unit 7: Non-parametric tests**

When to use, Assumptions, Comparing two independent conditions (Wilcoxon rank-sum test, Mann-Whitney test), Several independent groups (Kruskal- Wallis test), Comparing two related conditions (Wilcoxon signed-rank test), Several related groups (Friedman's anova), Post-hoc analysis in non-parametric analysis. Categorical testing: Pearson's Chi-square test, Fisher's exact test, Likelihood ratio, Yates' correction, Loglinear Analysis.

## **Unit 8: General Linear Models (GLM 1 to 5)**

Theoretical basis of GLM: Assumptions and practical considerations, Comparing several means, ANCOVA, Factorial Anova, Repeated Measure Anova, Mixed Design Anova, MANOVA,

## **Unit 9: Factor Analysis**

Theoretical foundations of factor analysis, Exploratory and Confirmatory factor analysis, testing data sufficiency for EFA & CFA, Principal component Analysis, Factor rotation, factor extraction, using factor analysis for test construction, Interpreting the SPSS output: KMO & Bartlett's test, initial solutions, correlation matrix, anti-image, explaining the total variance, communalities, eigen-values, scree plot, rotated component matrix, component transformation matrix, factor naming

## **Unit 10: Cluster Analysis**

Basic concepts, purpose and uses, selecting distance measures, K-Means clustering and hierarchical clustering, combining the clusters, working with the SPSS output: agglomeration schedule, proximity matrix, cluster membership, icicle plot and dendograms, Transform values and transform measures

## **Unit 11: Profile Analysis**

Basic concepts, Assumptions and Practical issues, Difference in levels, Parallelism and flatness in profiles, , profile contrast (simple effect analysis & interaction contrast), Doubly-Multivariate Design, Classifying profiles, Practical Demonstration using standard scales, Interpreting the SPSS output: test of between subject effects (Intercepts, groups, effects), test of within subject effects-sphericity, Greenhouse-Geisser, Hyunh-Feldt, test of within subject contrast- linear, quadratic, cubic.

## **Unit 12: Discriminant Analysis**

Derivation and test of discriminate function, types of discriminant function: direct, sequential, stepwise. Interpreting discriminant function: discriminant plots, structure matrix loading, Interpreting the SPSS output: Log determinants, Box test, Wilks' Lambda, canonical discriminant function coefficient, Function at group centroids, Classification results

## **Unit 13: Survival Analysis**

Meaning and types: non-parametric, semi-parametric and parametric, Life tables, cumulative proportion surviving, Hazard and density functions, table of group differences, Using SPSS: procedures-Kaplan-Meier, Cox-Regression, Cox-Regression with time dependent covariate, survival function, Omnibus Test.

## **Unit 14: Neural network Analysis**

Understanding neural network structures, multilayer perceptrons-uses in estimation of cost and time (predicted-by-observed charts, Residual-by-predicted charts), Radial basis functions-ROC curve, cumulative gains and lift charts,

## **Unit 15: Time Series Analysis**

Using time series analysis for forecasting, detecting trends and patterns in data, Box-Jenkin (ARIMA) method - forecasting using moving averages method, forecasting using trend analysis, seasonal decomposition, spectral plots, running analysis, understanding & interpreting output.

## **Lab Work & Project:**

All the units will include discussion on theoretical concepts followed by practical SPSS demonstration on real/simulated data. Learners are welcome to bring and discuss their actual problems related to quantitative analysis. Our every learner receives personal attentions and we endeavour to equip every learner to develop a sense of professional competency in quantitative data analysis using SPSS.

**Course Fee:** Fee for online mode is Rs. 25,000 + 12.36% service tax per semester. Group discounts available.

**Duration of Course:** 12 months (2 semesters). All the participants will be awarded diploma certificates after the successful completion of the course.

**Registration:** [Click here to Sign Up for the course](#). Also, you can contact or SMS with your name, mobile no, and email for registration at +91 9953511407.

**Mode of Teaching:** Classroom, Online, Lab Work, Field Work, entrepreneurship and incubation initiative. Evaluation will be done at the end of each semester.

### **About Heurexler Research:**

Heurexler Research Pvt. Ltd. is a privately held research company that works at the interface of standard scientific research and expertise and the corporate requirement and receptiveness for the same. At Heurexler we strive to make the serious scientific research a staple for the practical solutions required for addressing the challenges of modern business life and competitive growth. Our company offers customized human resource and testing services & develops new psychometric tests to suit the special needs of our clients. Our core services include dealing with predictive analytics and data science, providing market research, psychometric, training, assessment, and related human resource services. Our team consists of highly qualified research professionals, academicians and experts working with cutting edge quantitative and qualitative technologies to provide competitive and innovative solutions to our clients. Our clients are spread across Europe, Asia and America. We are proud partner of IBM and Atlas.ti for distribution and training of SPSS, Amos, and Atlas.ti software in India.

### **About Gyan Bharti Institute of Technology**

Gyan Bharti Institute of Technology is part of Gyan Bharti Group of Institutions, Meerut, affiliated to Mahamaya Technical University, U.P., India, and approved by AICTE (Ministry of HRD, Govt. of India). This educational group is instrumental in spreading the knowledge in the field of Engineering & Technology & Management. It provides a unique educational learning environment with high ethics to serve the nation & world and to accept the challenges of global arena. Heurexler Research in association with GBIT as a training and resource partner is imparting training to students and faculties in the area of data science, quantitative and qualitative data analysis using IBM SPSS, AMOS, MAXQDA, Atlas.ti and R.