Prospectus of

Diploma in Applied Statistics 2024

Conducted by

Institute of Applied Statistics, Sri Lanka

(Incorporated by Parliament Act No. 38 of 2011)

Diploma in Applied Statistics (DAS) Program

The Diploma in Applied Statistics (DAS) program at the Institute of Applied Statistics Sri Lanka (IASSL) is designed to equip students with a comprehensive understanding of statistical principles and their practical applications in various fields. This program aims to foster analytical skills, critical thinking, and proficiency in statistical tools, preparing students for a successful career in data analysis and decision-making.

General

1 The Diploma in Applied Statistics is a one-academic year program and equivalent to Level 1 of a B. Sc. Degree in Statistics.

2 An academic year consists of two semesters and a semester consists of 20-24 weeks that may be spread over six calendar- months.

3 The successful students would be able to register for the Higher Diploma in Applied Statistics.

Admission Requirements

To be eligible for admission to the Diploma in Applied Statistics, a candidate should have one of the following:

i. A minimum of three passes at the G.C.E.(A/L) examination in any stream with Mathematics/ Higher Mathematics/ Combined Mathematics/ Business Statistics as a subject,

or

ii. A minimum of three passes at G.C.E.(A/L) examination in any stream and a minimum of 'B' pass for Mathematics at G.C.E.(O/L),

or

iii. Secured an equivalent qualification acceptable to the Executive Council.

Exemptions

i. The Council upon the recommendation of the ATC, may grant specific credit exemptions in recognition of qualification(s) obtained previously.

ii. The total credit exemptions so granted shall not exceed ten (10) credits out of the total of thirty (30) credits of the program required for the award of the Diploma.

iii. The grade that shall be awarded for an exempted course unit should be grade C

Course Units

COURSE CODE	COURSE TITLE	CREDIT
Semester I		
DSTA1301	Mathematics for Statistics	3
DSTA1302	Descriptive Statistics and Probability	3
DSTA1303	Statistical Distributions	3
DSTA1304	Survey Methods	3
DSTA1205	Statistical Software	2
Semester II		
DSTA2301	Applied Regression Analysis	3
DSTA2202	Categorical Data Analysis	2
DSTA2203	Analysis of Time Series Data	2
DSTA2304	Parametric Statistical Inference	3
DSTA2305	Experimental Designs	3
DSTA2206	Nonparametric Statistics	2
DSTA2107	Data Analysis with Spreadsheet	1
Total Credits		**30**

Course Contents:

DSTA1301 - Mathematics for Statistics [3 credits]

Number Line: Integers, Natural numbers, Rational numbers, Irrational Numbers, real numbers, Surds. **Set Theory:** Description of a set and set notations, Subsets, Set operations, Rules of set Algebra. **Functions:** Definition, Domain, co-domain and range of a function, Types of functions and their properties, Graphs of functions. **Techniques of Counting:** Permutation and Combination, Binomial expansion and binomial theorem. **Techniques of Summation:** Sigma notation, Series, Sum of a series, Arithmetic and geometric series. **Coordinate Geometry:** Cartesian coordinate systems, Coordinate geometry of straight lines. **Calculus:** Limits, Derivatives, Differentiation and Integration. **Basic Matrix Algebra.**

DSTA1302 - Descriptive Statistics and Probability [3 credits]

Introduction to statistics (Definition, scope and limitations), **Data collection** (Observational and experimental studies, censuses and sample surveys, steps of data collection, methods of data collection); **Data Types:** Qualitative, Quantitative, Discrete, Continuers, Nominal, Ordinal, Interval, Ratio; **Exploratory Data Analysis:** One way and two way frequency tables, Histogram, frequency polygon, Frequency curve, Bar chart, Pie Chart, Stem-and-leaf plot, Box plot, Scatter plot, **Classification of data:** grouped and ungrouped data; **Measures of Central Tendency** (Mean: arithmetic, weighted, harmonic, geometric, Median, Mode), **Relative measures of central tendency** (quartiles, deciles, percentiles), **Measures of Dispersion** (Range, IQR, Quartile deviation, Mean deviation, Standard Deviation, Variance), **Relative measure of dispersion** (Coefficient of Variation), **Skewness and Kurtosis**, **Probability:** Introduction, Approaches to

probability, Rules of calculating probability, Applying the addition and multiplication rules, Conditional probability, Independence of events, Total probability law, Bayes' rule.

DSTA1303 - Statistical Distributions [3 credits]

Random Variables: Concept of random variables, Types of random variables. **Distributions:** Discrete/Continuous probability distribution and Cumulative probability distribution. **Properties of Random Variables:** Expected values, Variance, Moment Generating Functions. **Discrete Probability Distributions:** Bernoulli, Binomial, Poisson and their applications. **Continuous Probability Distributions:** Uniform, Normal, and Exponential and their Applications. Sampling Distributions, introduction to Students' t, Chi-square, and F distributions. **Central Limit Theorem (CLT):** Introduction to CLT and its applications. **Use of statistical software to generate random numbers and calculate probabilities (**pdf, cdf, inverse cdf**).**

DSTA1304 Survey Methods [3 credits]

Introduction: Sample Surveys and Census, Experimental and Observational studies. **Data Collection:** Planning and designing of a statistical survey, Methods of collecting data, Primary and Secondary data, Designing schedules and Questionnaires, Pilot studies, Online surveys. **Sampling and Methods of Sampling:** Sampling, Sampling Frame, Random and Non-random Sampling, Advantages of Sampling, Sampling and Non-Sampling Errors. **Probability Sampling Methods:** Simple Random Sampling, Stratified Random Sampling, Systematic Sampling, Cluster Sampling, Probability Proportional to Size Sampling. **Nonprobability Sampling methods:** Convenience Sampling, Quota Sampling, Judgment Sampling, Snowball Sampling. **Parameter estimation for Simple random sampling and stratified random sampling, Sample Size Calculation for mean and proportion.**

DSTA1205 Statistical Software [2 credits]

Introduction to R/Python Programming: Basic syntax, variables, data types, control structures (loops and conditionals), Functions, and libraries. **Data Structures and Manipulation**: Vectors, matrices, lists, and data frames, import and export datasets, data cleaning, outlier detection, and manipulation techniques, and missing data handling. **Data Wrangling and Transformation**: Reshaping datasets (Merging, sorting, and joining datasets)**. Exploratory Data Analysis (EDA):** Descriptive statistics, Data visualization.

DSTA2301 Applied Regression Analysis [3 credits]

Introduction to Regression Analysis. **Correlation Analysis**; Understanding correlation coefficients, and Interpreting correlation results. **Simple Linear Regression;** Assumptions and model formulation, Parameter estimation, ANOVA, hypothesis testing, and interpretation of regression output. **Multiple Linear Regression;** Assumptions and model formulation, Model interpretation and diagnostics, Variable selection techniques. **Regression with Dummy Variables;** Incorporating categorical variables and interpreting dummy variable coefficients. **Model**

Adequacy Checking; Checking model assumptions, goodness of fit, multicollinearity, and influential observations. **Analysis with Software;** Hands-on sessions using R for regression analysis.

DSTA2202 Categorical Data Analysis [2 credits]

Exploring categorical data: Frequency tables, Contingency tables (Marginal table and partial tables), bar charts, multiple bar charts, and stack bar charts. **Chi-square test**: measuring association between two nominal variables, advantages and disadvantages of Chi-square test and limitations of Chi-square test. **Linear trend test**: measuring association between two ordinal variables, advantages and disadvantages of linear trend test and limitations of linear trend test. **Association between two binary variables**: Phi coefficient, Risk difference, Relative risk, and Odds ratios.

DSTA2203 Analysis of Time Series Data [2 credits]

Introduction to time series, Applications of time series analysis, Components of a time series, Decomposition of time series, Additive and Multiplicative models, Simple forecasting techniques: Moving averages, Exponential smoothing, Holt-Winters procedure. Time series operators (Moving averages, Difference operator, and Lag operator), Transformations, Introduction to auto-covariance function, Auto-correlation function, Stationary time series. Hands-on practical with statistical software.

DSTA2304 Parametric Statistical Inference [3 credits]

Estimation: parameter and statistic, estimator and estimate, Types of estimation and their properties, **point estimation:** Point estimates for mean, Proportions, and variance of a population. **Interval estimation:** Interval estimates for mean, proportion, and variance. **Hypothesis Testing:** Definition of hypothesis, Null and Alternative hypotheses, Type I, and Type II errors, Power of a test, Level of significance, p-value, Procedures for hypothesis testing. Test of hypothesis for one sample and two sample tests for mean, proportions, and variance.

DS DSTA2305 Experimental Designs [3 credits]

Basic design principles. Single Factor and Two Factor Factorial Experiments; Completely Randomized Design, Randomized Complete Block Design, and Latin Square Design. Analysis of Variance. Comparison of means (Pairwise comparisons: Least Significant Difference, Duncan's Multiple Range test. Dunnett's test, Tukey's Studentized Range test, and Group comparisons: contrast analysis).

DSTA2206 Nonparametric Statistics [2 credits]

Introduction to nonparametric tests, Goodness of fit tests (Kolmogorov-Smirnov test, Chi-squared test). **Single sample tests** (runs test, sign, and Wilcoxon signed-rank test). **Two sample tests** (Wilcoxon signed rank test, Mann-Whitney U test). **More than two sample tests** (Kruskal-Walli's test, Friedman test). **Nonparametric measures of correlations** (Spearman's and Kendal's Tau test).

DSTA2107 Data Analysis with Spreadsheet [1]

Introduction to Spreadsheet Software: Overview of popular spreadsheet tools, Basic functionalities, and interface navigation. **Data Entry and Cleaning:** Techniques for efficient data entry, Cleaning, and transforming raw data for analysis. **Data Visualization in Spreadsheets:** Creating charts and graphs, Customizing visual elements for effective communication. **Basic Statistical Analysis:** Descriptive statistics. **Advanced Spreadsheet Functions:** Pivot tables for dynamic data summarization, Lookup, and reference functions. **Hypothesis Testing**, **Correlation, and Regression Analysis:** Understanding relationships between variables, Regression analysis for predictive modeling. **Time Series Analysis**: Analyzing temporal trends in spreadsheet tools.

Grading System

Marks Range	Grade	Grade Point Value
85-100	A+	4.2
70 -84	A	4.0
65 -69	A-	3.7
60 -64	B+	3.3
55 -59	B	3.0
50-54	B-	2.7
45-49	C+	2.3
40- 44	C	2.0
35 -39	C-	1.7
30-34	D+	1.3
25-29	D	1.0
00-24	E	0.0

OTHER INFORMATION

Course Duration: 1 Year

Mode: Online

Commencement Date: 6th April 2024

Course Fee: LKR.90,000/-

(Optional - 10% Discount for full payment at the registration, Installments Facility, Credit Card payments are allowed)

Application: https://forms.gle/qigMVuhqz2VEhyY79

Deadline for Application: 28th February 2024

For any other assistance – 011 2 588 291/ appstatsl@gmail.com