The aim of this course is to learn and apply a range of Statistical Modelling and Analysis techniques applicable for data analysis.

**LEARNING OUTCOMES – SUBJECT MASTERY**

- Detailed understanding of the concepts, issues, principles and theories of statistical modelling and analysis

- Understanding and practical knowledge of statistical modelling and analysis techniques to apply suitable methodologies for a given task

- Practical experience of analysing, designing, implementing and validating experiments using common statistical techniques.

**LEARNING OUTCOMES – PERSONAL ABILITIES**

- Ability to deal with and make informed judgements about statistical models and analysis

- Exercise autonomy and initiative in performing data analysis.

- Showing initiative and team working skills in shared data analysis. (PDP)

- Demonstrate reflection on statistical modelling and analysis issues. (PDP)

**SYLLABUS**

A practical understanding of:
F20SA Statistical Modelling and Analysis

- Basic probability concepts: Random variables and their distributions; how distributions relate to sampling scenarios.
- Joint distributions, Sums of random variables, Central limit theorems
- Classical inference: Point estimation, moment estimators and maximum likelihood; Confidence intervals – calculation and interpretation; Hypothesis testing and p-values
- Essentials of Bayesian inference: Priors and posteriors; Credible intervals; Predictive distributions
- Modelling approaches: Regression and ANOVA;
- Multivariate exploratory techniques: Principal Components Analysis + Factor Analysis; Introduction to non-parametric methods
- Practical elements in R or Python

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