F21SA Statistical Modelling and Analysis

**COURSE DETAILS**
- **Course Code:** F21SA
- **Full Course Title:** Statistical Modelling and Analysis
- **SCQF Level:** 11
- **SCAF Credits:** 15
- **Available as Elective:** No

**DELIVERY LEVEL**
- **Undergraduate:** No
- **Postgraduate Taught:** Yes
- **Postgraduate Research:** No

**Additional Information:**

**COURSE AIMS**
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 and critical understanding of the concepts, issues, principles and theories of statistical modelling and analysis
- Critical theoretical and detailed practical knowledge of statistical modelling and analysis techniques
- Practical professional experience of analysing, designing, implementing and validating experiments using common statistical techniques.

**LEARNING OUTCOMES – PERSONAL ABILITIES**
- Ability to deal with complex issues and make informed professional judgements about statistical models and analysis
- Exercise substantial autonomy and initiative in performing data analysis.
- Showing initiative and good professional team working skills in shared data analysis. (PDP)
- Demonstrate critical reflection on statistical modelling and analysis issues. (PDP)

**SYLLABUS**
A practical understanding of:
- Basic probability concepts: Random variables and their distributions; how distributions relate to sampling scenarios.
- Joint distributions, Sums of random variables, Central limit theorems
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- 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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