Course descriptor F21SA

Course code	**F21SA**
Course title	Statistical Modelling and Analysis
Credits	15
School	Mathematical and Computer Sciences
SCQF Level	11
Semester	1
Aims	The aim of this course is to learn and apply a range of Statistical Modelling and Analysis techniques applicable for data analysis
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 • 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

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.
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)

Assessment method	30% course work 70% examination