1. Course Code: F21SA
2. Course Title: Statistical Modelling and Analysis
3. SCQF Level: 11
4. Credits: 15
5. School: Mathematical & Computer Sciences
6. Course Co-ordinator: Alasdair Gray
7. Delivery: Location & Semester
   - Edin: Sem 1
   - SBC: Sem……
   - Orkney: Sem……...
   - Dubai: Sem 1..
   - IDL: Sem…
   - Collaborative Partner: Name…………………….Sem……
   - Approved Learning Partner: Name …………………………………Sem………
8. Pre-requisites: Basic probability
9. Linked Courses (specify if synoptic): None
10. Excluded Courses: None
11. Replacement Courses
    - Code: 
    - Date Of Replacement: 
    - Degrees for which this is a core course: PGT Computer Science Programmes
12. The course may be delivered to: UG only ☐ PG only ☒ UG & PG ☒
13. Available as an Elective?: Yes ☐ No ☒
14. Aims
   The aim of this course is to impart a range of Statistical Modelling and Analysis techniques for data analysis and demonstrate their practical application.
15. Syllabus
   - 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; Generalised linear models; Time series models
   - Multivariate exploratory techniques: Principal Components Analysis + Factor Analysis; Introduction to non-parametric methods + randomisation tests
   - Experimental design
   - Practical elements using R or Python
17. Learning Outcomes (HWU Core Skills: Employability and Professional Career Readiness)

Subject Mastery

- Understanding, Knowledge and Cognitive Skills
  - 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.

Scholarship, Enquiry and Research (Research-Informed Learning)

Personal Abilities

- Industrial, Commercial & Professional Practice
- Autonomy, Accountability & Working with Others
- Communication, Numeracy & ICT
  - 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)

18. Assessment Methods

<table>
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<th>Method</th>
<th>Duration of Exam (if applicable)</th>
<th>Weighting (%)</th>
<th>Synoptic courses?</th>
<th>Method</th>
<th>Duration of Exam (if applicable)</th>
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19. Re-assessment Methods

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20. Date and Version

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