Liverpool John Moores University

Title:	STATISTICAL MODELLING
Status:	Definitive
Code:	**5014DACOMP** (125358)
Version Start Date:	01-08-2021
Owning School/Faculty:	Computer Science and Mathematics
Teaching School/Faculty:	Computer Science and Mathematics

Team	Leader
Mark Taylor	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	56.5
Total Learning Hours:	200	**Private Study:**	143.5		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	33

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Case Study Analysis	60	
Exam	AS2	Examination	40	1.5

Aims

To develop a theoretical knowledge of statistical skills to solve data science problems
To develop and display solutions to data science problems by applying statistical theory using appropriate software applications

Learning Outcomes

After completing the module the student should be able to:

1	Applying appropriate statistical theory data science problem to derive meaningful solutions.
2	Apply appropriate statistical theory and derive meaningful solutions in a suitable programming language

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Case Study Analysis	2
Examination	1

Outline Syllabus

Review summary statistics
Assumption testing for statistical test
Normality
Multivariate normality
Homoscedasticity
etc
Correlation and Covariance
Non-parametric test – Chi Square
T-Tests
- *One sample T-test*
- *Two sample T-test*
- *Paired Two-sample T-Test*
- *ANOVA*

Linear Models
- *Simple Linear Regression*
- *Multiple Regression*

Discussion of Generalized Linear Models
- *Logistic Regression*
- *Poisson Regression*

Model Diagnostics
- *Residuals – ANOVA – Akaike Information Criteria (AIC)*
- *Cross-Validation*
- *Bootstrap*
- *Nonlinear Models*
- *Nonlinear Least Squares*
- *Generalized Additive Models*
- *Decision trees*
- *Random Forests (Ensemble)*

Learning Activities

Lectures will be used to introduce and demonstrate topics, however the key component in the module is the use of accessible practical tasks to reinforce the theoretical aspects of the lecture material which will be reinforced through practical work.
This module will have online practical.

Notes

Although an apparently heavy theoretical treatment of the area, this is intended to be a practical, hands-on exploration of the area.