Liverpool John Moores University

Title:	MODELLING
Status:	Definitive
Code:	**4011MATHS** (117231)
Version Start Date:	01-08-2016

Owning School/Faculty: Applied Mathematics
Teaching School/Faculty: Applied Mathematics

Team	Leader
Paulo Lisboa	Y
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Academic Level:	FHEQ4	**Credit Value:**	24
Total Delivered Hours:	72		
Total Learning Hours:	240	**Private Study:**	168

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	24
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Portfolio	AS1	Continuous assessment of mathematical modelling methods using computer-aided methods (20%) and personal tutorial questions (30%).	50	
Presentation	AS2	Presentations on statistical analysis of real-world data.	20	
Report	AS3	Report on applications of eigenvalues and eigenvectors to data visualisation.	20	
Self Awareness	AS4	Complete a World of Work Skills Bronze statement on Self	10	

Category	Short Description	Description	Weighting (%)	Exam Duration
Statement		Awareness and then reflect on your feedback using a standard template.		

Aims

To introduce the student to mathematical modelling and analytical reasoning linked to real-world applications.

To enable the student to understand a fundamental concept of matrix factorisation and apply this concept in different contexts.

The module also includes the WoW Bronze reflection task.

Learning Outcomes

After completing the module the student should be able to:

1   Problem solving: understand the importance of interpreting problems in mathematical form.
2   Presentation: model sports data using regression methods and present as a group.
3   Analysis: understanding the concept and practice of matrix factorisation.
4   Demonstrate appropriate communication and reflecting skills.

Learning Outcomes of Assessments

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

Portfolio   1

Presentation   2

Report   3

Bronze Statement &   4
Reflection

Outline Syllabus

Semester One

Mathematical methods for modelling
Notion of proof
Review of least squares regression and application to performance data

Semester Two

Mathematical methods for modelling
Review of matrices and matrix factorisation
Definition of the covariance matrix for multivariate data in 2d
Eigenvalues as representations of directions of maximum data spread

Learning Activities

Lectures, tutorials, laboratory sessions, directed reading and coursework preparation.

Notes

This is an integrative module to give students proficiency and confidence in the use of fundamental mathematical tools, namely data fitting and matrices. The second semester focuses primarily on the application of eigenvalues and eigenvectors, not only as important concepts, but also as the kernel for many applications. The module sets the foundation for relating defined mathematical tools to areas of mathematical sciences and therefore has a focus on problem solving using theoretical material covered in more detail in other modules.