

Liverpool John Moores University

Title: Foundations of Machine Learning
Status: Definitive
Code: **7143COMP** (127276)
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
Paul Fergus	Y
Carl Chalmers	

Academic Level: FHEQ7 **Credit Value:** 20 **Total Delivered Hours:** 33
Total Learning Hours: 200 **Private Study:** 167

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	11
Practical	11
Tutorial	11

Grading Basis: 50 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Theoretical Principles of Machine Learning	40	
Artefacts	AS2	Develop a Machine Learning Project	60	

Aims

To develop knowledge and an understanding of machine learning at masters level and provide guidance on the design and development of machine learning projects using both theory and practice.

To provide an understanding of a range of tools, techniques, algorithms, and data

processing approaches.

To critically evaluate machine learning methodologies and their appropriate use to solve real-world problems.

Learning Outcomes

After completing the module the student should be able to:

- 1 Demonstrate advanced understanding of the theoretical principles and objectives of Machine Learning (ML)
- 2 Critically evaluate and apply advanced ML concepts and techniques
- 3 Select appropriate ML algorithms to solve particular tasks
- 4 Critically evaluate ML algorithms to determine their strengths and weaknesses
- 5 Implement, validate and test different ML algorithms introduced in the module using Python and associated frameworks

Learning Outcomes of Assessments

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

Theoretical Report	1	2		
ML Project	3	4	5	

Outline Syllabus

1. *Machine Learning Fundamentals*
2. *Data Engineering*
3. *Unsupervised Learning*
4. *Supervised Learning*
5. *Linear Regression*
6. *Logistic Regression*
7. *Random Forests and Ensemble Methods*
8. *Support Vector Machines*
9. *Dimensionality Reduction*
10. *Feature Engineering*
11. *Performance, Validation and Model Interpretation; Large Scale Machine Learning*

Learning Activities

Formal lectures will introduce core topics. Tutorials and in-class practical, Lab based group activities will provide exercises to develop skills.

Notes

This module provides fundamental skills required in machine learning to solve real-world problems. These skills will help to equip the student with the fundamental

principles of machine learning to support advanced topics taught in the course. Furthermore, these skills will be practical core requirements for a successful career as a machine learning engineer in industry.