MODULE SPECIFICATION

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Refer to guidance notes for completion of each section of the specification.

Module Code:	COM714

Module Title:	Machine Learning

Level:	7	**Credit Value:**	20

Cost Centre(s):	GACP	JACS3 **code**: HECoS code:	I460 100992

Faculty	FAST	**Module Leader:**	Jessica Muirhead

Scheduled learning and teaching hours	21 hrs
Placement tutor support	0 hrs
Supervised learning eg practical classes, workshops	27 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total contact hours	**48** hrs
Placement / work based learning	**0** hrs
Guided independent study	152 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
MSc Data Science and Big Data Analytics	✓	☐

Pre-requisites
Studied COM713 Advanced Data Structures and Algorithms

Office use only
Initial approval: 22/07/2020 Version no:1
With effect from: 01/09/2020
Date and details of revision: Version no:
23/12/2021 AM0 Administrative change to number of portfolio tasks

Module Aims
This module introduces students to the practical challenges of applying machine learning techniques to real-world problems. Building on their existing programming knowledge, students will gain a broad understanding of the key concepts, methodology and techniques required to develop effective algorithms to analyse large data sets. This will be combined with the analysis techniques required to compare, select and justify the use of appropriate machine learning methods whilst developing programmed solutions.

Module Learning Outcomes - at the end of this module, students will be able to	
1	Identify problems that can be solved using machine learning problems.
2	Make informed decisions when selecting which machine learning methods should be applied to theoretical and real-world problems.
3	Apply machine learning and data science terminologies to communicate key concepts.
4	Apply machine learning methods using a software package, including tracing, debugging and revising existing machine learning programs from a third party.
5	Evaluate and compare different machine learning methods for a given problem experimentally and select the appropriate methods using various assessment criteria.
6	Display the results of machine learning methods and critically propose appropriate improvements to methods.

Employability Skills **The Wrexham Glyndŵr Graduate**	**I = included in module content** **A = included in module assessment** **N/A = not applicable**
CORE ATTRIBUTES	
Engaged	I
Creative	I/A
Enterprising	
Ethical	I
KEY ATTITUDES	
Commitment	
Curiosity	I/A
Resilient	I
Confidence	
Adaptability	I/A
PRACTICAL SKILLSETS	
Digital fluency	I/A
Organisation	A

Leadership and team working	I
Critical thinking	I/A
Emotional intelligence	
Communication	I/A

Derogations

None

Assessment:

Indicative Assessment Tasks:

This module is assessed through a series of Portfolio tasks designed to test students' understanding of the module content. At the end of the module, a final larger activity will ensure students can apply and communicate appropriate solutions to a simulated problem.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2,3	Portfolio	70%
2	4,5,6	Project	30%

Learning and Teaching Strategies:

Learning will be delivered through a practical approach, with a series of workshop sessions combining short theory lectures with student-led activities to prepare solutions to simulated problems. In-class sessions will be augmented with guided learning videos and suggested reading to ensure students understand the industry challenges faced by machine learning practitioners.

Syllabus outline:

1. Definitions and types of machine learning
2. Challenges of machine learning
3. Classification and Training models
4. Support vector machines, decision trees, ensemble learning, random forests and dimensionality reduction
5. Unsupervised learning techniques
6. Neural networks
7. Natural language processing
8. Reinforcement learning

Indicative Bibliography:
Essential reading
Geron, A. (2019). *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. O'Reilly.
Other indicative reading
*Alp*aydin, E. (2014). Introduction to machine learning. 3rd ed. MIT press. Bell J. (2015) Machine Learning: Hands on for Developers and Technical Professionals. John Wiley & Sons Press Burkov A. (2019) The Hundred-page Machine Learning Book. Self-published