



Unit Title	Machine Learning and AI (blended)
FHEQ Level	Level 6
Unit Code	DGM20303
Credit Value	30
Unit Type	Subject

Learning Hours			
Staff – Student Contact Hours		Independent Study Hours	
Classes	40	Independent study	210
Supervised access to Ravensbourne resources	20	Preparation for assessment	30
Total		300	

Unit Description

Machines are getting better at decision making and are helping humans in many fields such as healthcare, engineering and marketing. Machine Learning (ML) is the process where computers gain the ability to solve problems without human intervention and can improve their learning with increasing data. Due to enormous amounts of processing powers, machines can identify specific patterns much faster than humans.

With the help of these techniques, users are able to extract patterns for decision making. The use of AI and ML in marketing can provide valuable information to the marketer in providing personalised pitch and running more effective campaigns for potential customers.

The Five Principles underpin the Mindsets and Skillsets Manifesto and are the foundation upon which all course curriculum frameworks and unit specifications are based. The relevant Principles as stated below have been mapped against the Learning Outcomes relevant to each course unit and at each level (see Programme Specifications for full description of the Five Principles):

1. Cultivate / Where the individual thrives.
2. Collaborate / Where disciplines evolve.
3. Integrate / Where education engages industry.
4. Advocate / Where purpose meets practice.
5. Originate / creativity meets technology.

Unit Indicative Content

- Foundations of machine learning,
- Types of learning problems
 - classification regression
 - clustering etc.
- Taxonomy of machine learning algorithms
 - supervised learning
 - unsupervised learning
 - reinforcement learning
- Machine learning algorithms
 - Decision Tree
 - Naïve Bayes
 - k-Nearest Neighbour
 - Support Vector Machine.
- Introduction to AI
- Programming language such as C/C++, C#, Java, Prolog, Lisp, Python, R,
- Tool such as Weka, KNIME, MS AzureML, Accord.NET, AForge.NET, Neuroph
- Tools for NLP (NLTK, AIML)
- Current trends in AI
- Ethical aspects of AI
- User data in legal context

Unit Aims

To analyse the theoretical foundations of machine learning and artificial intelligence and how they work in a context.

To investigate popular and efficient machine learning and artificial intelligence algorithms used by the industry.

To develop an application using an appropriate programming language or tool demonstrating ML&AI features.

To critically evaluate the outcome or the result of the application to determine the effectiveness of the learning algorithm used in the application.

Unit Learning Outcomes

LO 1 Research/Inspiration

Select and evaluate information gathering techniques using a wide range of sources, providing visual, contextual and industry case-study research as appropriate.

Related Principle: ORIGINATE

LO 3 Development/Prototyping

Investigate potential pathways that result in appropriate solutions, informed by a systematic understanding of the principles of the creative process. Related Principle: INTEGRATE

LO 5 Presentation /Storytelling for Influence

-Communicate projects creatively and professionally, whether in visual, oral or written form. Methods of presentation are appropriate to the audience/client and the purpose of the work.

Related Principle: ADVOCATE

LO 7 Employability

Effectively employ professional transferable and employability skills, including the ability to manage time and work to clear briefs and deadlines, respond to set goals, and communicate effectively.

Related Principle: CULTIVATE

Learning and Teaching Methods

This unit will be delivered using a combination of:

- Lectures / Seminars
- Online activities
- Self-directed independent study
- Peer learning, group discussion, guest speakers

Assessment methods and tasks

Assessment tasks	Weighting (%) <i>(one grade or multi-grade unit)</i>
Project proposal presentation	20%
Artefact final presentation	80%

Indicative Assessment Criteria

Develop a prototype application and apply AI & ML tools and techniques

Evaluate your artefact and discuss your choice of algorithm and tools.

Critically evaluate the effectiveness of your selected approach and give recommendations

Essential Reading list

Bell, J. (2014) Machine Learning: Hands-On for Developers and Technical Professionals. 1st Ed. Wiley.

Flach, P. (2012) Machine Learning: The Art and Science of Algorithms that Make Sense of Data. 1st Ed. Cambridge: Cambridge University Press.

Recommended reading

Kirk, M. (2014) Thoughtful Machine Learning: A Test-Driven Approach. O'Reilly Media.
Engelbrecht, A. (2007) Computational Intelligence: An Introduction. Wiley-Blackwell.
Warwick, K. (2011) Artificial Intelligence: The Basics. Routledge.

Websites

<https://pages.arm.com/machine-learning-for-dummies.html>

archive.ics.uci.edu/ml

www.lfd.uci.edu

cran.r-project.org www.cs.waikato.ac.nz www.knime.org www.codechef.com

julialang.org pkg.julialang.org azure.microsoft.com accord-framework.net

Links

University of California, Irvine

“Machine Learning Repository” (Data sets)

University of California, Irvine – Laboratory for

The R Project for Statistical Computing “R Archive Network” (Development Tool)

University of Waikato – Machine Learning Group “Data Mining Software in Java”
(Development Tool)

Konstanz Information Miner “KNIME” (Development Tool)

CodeChef educational initiative “List of Compilers” (Wiki)

Julia Programming Language (Development Tool) Julia Programming Language
(Development Tool) Microsoft Azure (Development Tool)

Accord.NET Framework (Development Tool)