



<b>Unit Title</b>	Artificial Intelligence and Machine Learning (blended)
<b>FHEQ Level</b>	Level 5
<b>Unit Code</b>	ECLC20203
<b>Credit Value</b>	15
<b>Unit Type</b>	Elective

Learning Hours (Blended)			
Staff – Student Contact Hours		Independent Study Hours	
Classes	37.5	Independent study	80
Supervised access to Ravensbourne resources		Preparation for assessment	32.5
<b>Total</b>	150		

## Unit Description

This unit introduces students to the basic theory of Machine Learning (ML) and Artificial Intelligence (AI). Students will gain first-hand experience of AI and ML tools available on local machines and cloud.

Machine learning is being used in a wide range of fields including but not limited to Creative Art, Retail, Military Intelligence, Healthcare, Gaming, Data Mining, Manufacturing, Banking and for improvement of efficiency in various fields. There is great scope for developments in media and computer vision for ML and AI techniques.

Machine learning and AI enable computers to learn from data or experience to solve problems without intervention from the humans. Recent developments in this field have resulted in some dramatic results where the computers could perform equal or better than humans.

In this unit students will learn about various ML algorithms, how they can provide some intelligent solutions and how to use them on data or images to identify different patterns. An intelligent machine is supposed to have vision, speech or voice recognition and be able to respond to unknown situations. Students may use Raspberry Pi, cloud or desktop-based systems to learn and develop an understanding of ML & AI techniques.

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

### AI & ML

#### Industry-wide Knowledge

- Train and Deploy Models
- Infrastructure
- Mathematics
- ML Frameworks
- Probability and Statistics
- Supervised / Unsupervised Learning
- Machine Learning Algorithms

#### AWS Specific Knowledge Area

- Deep Learning AMIs
- DeepLens
- Lex
- Machine Learning
- MXNet
- Polly
- Rekognition
- Sagemaker
- TensorFlow
- Translate

#### CyBOK knowledge areas

- Digital Forensics

## Unit Aims

1. Evaluate the principles of artificial intelligence, modern technologies and

potential issues affecting the developments of AI and ML.

2. Develop an AI based system using suitable development tools and techniques
3. Evaluate various approaches for Machine Learning and developing AI solutions
4. Critically Evaluate the performance of different learning algorithms

### Unit Learning Outcomes

*(to be selected from the Mini Manual)*

#### LO 1 Research/Inspiration

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

Related Principle: ORIGINATE

#### LO 4 (Pre) Production

Employ relevant knowledge of production skills alongside a grasp of the creative potential of a selection of processes, materials and methods that inform creative and academic practice.

Related Principle: COLLABORATE

LO 6 Critical and creative mindsets Analyse conceptions of diverse practice and use this to inform a course of action

Related Principle: ORIGINATE

#### LO 7 Employability

Demonstrate 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>
Demonstration and presentation of artefact based on ML and AI	100%

## Indicative Assessment Criteria

Review the contribution that AI has had on a global basis to individuals and society with the use of examples.

Select an appropriate project to work on and using suitable programming language, platform or tools develop an intelligent system based on a top- down approach or bottom up approach to overcome a real-world issue. (LO1, LO4)

Critically evaluate the effectiveness of the selected methodology and suggest methods of improvement. (LO7)

Critically evaluate the industrial and social implications of an emerging AI technologies (LO6).

## Essential Reading list

Pattanayak, Santanu. Intelligent Projects Using Python: 9 Real-World AI Projects Leveraging Machine Learning and Deep Learning with TensorFlow and Keras Keras. Packt Publishing, 2019.

Mueller, John, and Luca Massaron. Machine Learning for Dummies. John Wiley & Sons Inc., 2016.

## Recommended Reading List

Gift, Noah. Pragmatic AI: an Introduction to Cloud-Based Machine Learning. Addison-Wesley, 2019.

Antunes, Sandy. JUMPSTARTING Raspberry Pi Vision. San Francisco, 2018.

Further reading and resources will be identified in your Project Brief.