



Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Machine Learning

Unit ID: ITECH3500

Credit Points: 15.00

Prerequisite(s): (ITECH2500)

Co-requisite(s): Nil

Exclusion(s): (ITECH2111 and ITECH6111 and ITECH7001)

ASCED: 020119

Description of the Unit:

This unit provides you with an overview of contemporary trends in artificial learning. You will explore a wide range of topics, including classification, temporal analysis, and predictive analytics, and learn to utilise them to address applications in a variety of domains, such as computer vision and natural language processing.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:
Knowledge:

- K1.** Identify and explain a range of deep-learning architectures and methodologies for solving complex problems;
- K2.** Recognize complex modelling scenarios such as potential biases in data, and noise and confounding factors that may impact model performance
- K3.** Critically evaluate merits and limitations of artificial intelligence architectures, including societal and environmental impacts

Skills:

- S1.** Design and implement prototypical solutions to complex problems that meet industry guidelines, including strategies to mitigate assessed risks
- S2.** Contrast and compare the effectiveness of specific machine-learning methodologies, based on current literature
- S3.** Develop methodologies to evaluate and monitor machine learning models, prior to and after deployment

Application of knowledge and skills:

- A1.** Demonstrate judgement in identifying and adapting machine-learning methodologies to meet requirements
- A2.** Effectively communicate machine-learning concepts or proposed solutions

Unit Content:

Topics may include:

- Neural network architectures such as multi-layer perceptrons, convolutional neural networks and recurrent neural networks
- Advanced deep-learning architectures that address specific applications such as object detection, temporal predictions
- Advanced model training methodologies including loss functions, optimisers and their appropriate use
- Validation strategies

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor	Development and acquisition of FEDTASKS in the Unit	
	Learning Outcomes (KSA)	Assessment task (AT#)

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		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	<p>Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in:</p> <ul style="list-style-type: none"> Using effective verbal and non-verbal communication Listening for meaning and influencing via active listening Showing empathy for others Negotiating and demonstrating conflict resolution skills Working respectfully in cross-cultural and diverse teams. 	Not applicable	Not applicable
FEDTASK 2 Leadership	<p>Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in:</p> <ul style="list-style-type: none"> Creating a collegial environment Showing self-awareness and the ability to self-reflect Inspiring and convincing others Making informed decisions Displaying initiative 	A1	AT2
FEDTASK 3 Critical Thinking and Creativity	<p>Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in:</p> <ul style="list-style-type: none"> Reflecting critically Evaluating ideas, concepts and information Considering alternative perspectives to refine ideas Challenging conventional thinking to clarify concepts Forming creative solutions in problem solving. 	S2,A1	AT2,
FEDTASK 4 Digital Literacy	<p>Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in:</p> <ul style="list-style-type: none"> Finding, evaluating, managing, curating, organising and sharing digital information Collating, managing, accessing and using digital data securely Receiving and responding to messages in a range of digital media Contributing actively to digital teams and working groups Participating in and benefiting from digital learning opportunities. 	S1, S2, S3	AT1, AT2

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 Sustainable and Ethical Mindset	<p>Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in:</p> <ul style="list-style-type: none"> • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life. 	K3	AT1

Learning Task and Assessment:

Assessment for this unit will be based on a number of tasks including weekly tasks, written reports, and an end of semester examination covering theoretical aspects of the unit.

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2, S3.	Weekly tasks including: quizzes and exercises	Quizzes and/or exercises	20% - 40%
S1, S2, S3, A1, A2.	Students will conduct research to identify the most appropriate methodology to address a complex problem, including appropriate data management strategies, addressing computational complexity and risks. Students will implement the solution and communicate their findings.	Practical works and accompanying report and/or presentation	60% - 80%

Adopted Reference Style:

APA

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)