Module: Machine Learning 381

Module name:	Machine Learning 381
Code:	MLG381
NQF level:	7
Type:	Core – Bachelor of Computing (all streams)
Contact time:	34 hours
Structured time:	6 hours
Self-directed time:	40 hours
Notional hours:	80 hours
Credits:	8
Prerequisites:	MAT281; PRG281

Purpose

Machine learning is a subset of artificial intelligence. The overall purpose of the program is to produce graduates that can think clearly and critically and apply the knowledge of statistical techniques to give computers the ability to progressively improve performance on a specific task with data, without being explicitly programmed.

Outcomes

Upon successful completion of this module, the student will be able to:

- Demonstrate an integrated knowledge of the central areas of machine learning, including an understanding of, and the ability to apply and evaluate the key terms, concepts, facts, principles, rules, and theories of machine learning as well as detailed knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- Demonstrate an understanding of knowledge as contested and the ability to evaluate types of knowledge and explanations typical within machine learning.
- Demonstrate an understanding of a range of methods of enquiry in statistics, and their suitability to specific investigations; and the ability to select and apply a range of methods to resolve problems or introduce change within a practice.
- The ability to identify, analyse, evaluate, critically reflect on and address complex problems, applying evidence-based solutions and theory-driven arguments.
- The ability to develop appropriate processes of information gathering for a given context or use; and the ability to independently validate the sources of information and evaluate and manage the information.

Assessment

Assessment is performed using a variety of instruments:

- Continuous evaluation of theoretical work through written assignment, formative, and summative test.
- Final assessment through a written examination.

Teaching and Learning

Learning materials

Prescribed Book

Inferential Statistics – IT Without Frontiers.

Additional Material

📕 Presentation notes and hand-outs from direct instruction and feedback sessions;

📕 Stroud, K.A. (2007). *Engineering Mathematics*. Palgrave. [ISBN: 9781403942463]

📕 Wegner, T. (2016). *Applied Statistics*. JUTA. [ISBN: 9781485111931]

📕 Rowe, N. (1988). *Artificial Intelligence Through Prolog*. Prentice Hall. [ISBN: 9780130486790]

Learning activities

The teaching and learning activities consist of a variety of teaching approaches including formal lectures on theoretical concepts, exercises and discussions. One mandatory assignment and one mandatory project must be completed during the course. The experiences gained and progress made on these practical components will guide the discussions done in class.

Notional learning hours

Activity	Units	Contact Time	Structured Time	Self-Directed Time
Lecture		27.0		13.0
Formative feedback		3.5		
Project	1	3.5		9.0
Assignment	1			3.0
Test	2		4.0	8.0
Exam	1		2.0	7.0
		34.0	**6.0**	**40.0**

Syllabus

- K-mean Clustering
- Decision Trees
- Regression
- Association Rule Learning
- Logistic Regression Models
- Naïve Bayes Classifier