Module Descriptor

Title	Artificial Intelligence and Applications		
Session	2025/26	**Status**	Published
Code	COMP11127	**SCQF Level**	11
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Naeem Ramzan		

Summary of Module

This module covers the main analytical skills and tools in the field of Artificial Intelligence (AI). It will also build on the foundations on how to properly communicate this information to the relevant audience. The students will be progressively guided through the world of AI starting from an introduction to AI and its core concepts of designing and enabling AI by means of different methods including machine learning and genetic programming. Students will embark on the real-world problems and learn how to apply AI algorithms using a variety of existing architectures and languages including Python. Additional key advanced concepts and research trends in the field of AI will also be presented as well as the basic needed principles to communicate clearly and effectively. A special attention will thus be paid to AI applications so that the students will able to apply the AI techniques on the variety of problems.

With a diversity of lectures and lab work, the students will be able to make informed decisions on the most suitable methods to analyse how to apply AI on specific problems and get hands-on experience on their application. They will also learn how to interpret the results and communicate their findings using the appropriate visualisation tools and techniques. An indicative outline of the topics that will be covered follows:

• Introduction to AI

• Methods for machine learning

• Data preparation

• Basic Analytics/Pre-processing/Classifications

• Neural networks and Deep neural networks

• Natural language processing

• Applications of AI

Module Delivery Method	On-Campus[1] ☐	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	
Terms for Module Delivery	Term 1 ☒	Term 2 ☐	Term 3 ☐	
Long-thin Delivery over more than one Term	Term 1 – Term 2 ☐	Term 2 – Term 3 ☐	Term 3 – Term 1 ☐	

Learning Outcomes	
L1	Gain deep Knowledge and comprehensive understanding of the main methods and tools available for AI, including the underlying theoretical concepts
L2	Apply and evaluate different machine learning methods to real problems and make an informed decision on their suitability for specific situations.
L3	Design AI methodologies for specific problems including effective communication of main findings to relevant audiences, and critically appraise the results.
L4	N/A
L5	N/A

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	**SCQF 11** Comprehensive knowledge and understanding of the main methods and tools employed for AI including the underlying theory and principles.
Practice: Applied Knowledge and Understanding	**SCQF 11** Apply a variety of AI methodologies to real situations and communicate the results using available visualisation tools.
Generic Cognitive skills	**SCQF 11** Critical knowledge of the state-of-the-art in AI. Identify most suitable methods/tools to make informed decisions in a real situation. Design a complete AI methodology and communicate findings in real problems.

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Communication, ICT and Numeracy Skills	**SCQF 11** Effectively communicate the information extracted from AI applications using a variety of available tools, both from report writing and presentations. Critically appraise numerical results gathered from the analysed data.
Autonomy, Accountability and Working with Others	**SCQF 11** : Initiative and autonomy working in lab assignments. Students will also work as part of a team in project assignments and must develop a sense of accountability to others.

Prerequisites	Module Code	Module Title
	Other	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours. The module will be delivered by means of lectures and supervised hands-on lab work. Lectures will cover the theoretical background and practical applicability in real life problems. Concepts will be introduced by posing a practical problem and working out the needed theoretical knowledge to solve them. The delivery will encourage student participation to ensure an active learning experience. Group discussions will be held to promote critical thinking and boost informed decisions on the suitability of different state-of-the-art methods. Lab exercises will help student develop their knowledge in incremental fashion using a learning by-doing approach. This will support the development of knowledge and understanding of the topics. In addition, labs will develop their skills to carry out a full AI project and communicate the results, which will be part of the final assessment.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	20
Laboratory / Practical Demonstration / Workshop	28
Asynchronous Class Activity	48
Independent Study	102
Personal Development Plan	2
Please select	
TOTAL	200

Indicative Resources
The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

1] ERTEL W, 2011, Introduction to Artificial Intelligence, Springer [2] Russell and Norvig. Artificial Intelligence: A Modern Approach. [3] N D LEWIS, 2016, Deep Learning Step by Step with Python [4] Bart Baesens. Analytics in a Big Data World. The Essential Guide to Data Science and its Applications. John Wiley & Sons [5] I. H. Witten and E. Frank. Data Mining. Practical Machine Learning Tools and Techniques: Morgan Kauffman [6] S. Theodoridis and K. Koutrumbas. Pattern Recognition. Academic Press. Additional Resources can be found online and in scientific databases. Software packages: • Phython • R with relevant packages (ggplot2, etc.)

(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the [Student Attendance and Engagement Procedure](), Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following:

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: [UWS Equality, Diversity and Human Rights Code.]()

Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	Computing
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ Yes ☒ No **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**

School Assessment Board	Business & Applied Computing
Moderator	Keshav Dahal
External Examiner	A Malhi
Accreditation Details	
Module Appears in CPD catalogue	☒ Yes ☐ No
Changes / Version Number	0.2

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Lab works (30%). Students will be required to complete all lab sheets provided. The labs will both contain theoretical and practical excercises aiming at assessing the achievemeng of LO1 and LO2.
Assessment 2
Coursework(70%). Students will work in groups to develop a specific AI application. Coursework will assess achievement of LO2 and LO3 by means of a written report justifying the selection of methods, detailing the analysis, and presenting the results. Lab implementations will also be submitted and the main findings presented to the class.
Assessment 3
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.
(ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1

Assessment Type	LO1	LO2	LO3	LO4	LO5	Weighting of Assessment Element (%)	Timetabled Contact Hours
Lab reports	☒	☒	☐	☐	☐	30	10

Component 2

Assessment Type	LO1	LO2	LO3	LO4	LO5	Weighting of Assessment Element (%)	Timetabled Contact Hours
Written assignment/presentation assignment/laboratory implementation	☐	☒	☒	☐	☐	70	12

Component 3

Assessment Type	LO1	LO2	LO3	LO4	LO5	Weighting of Assessment Element (%)	Timetabled Contact Hours

							100%	4 hours
	☐	☐	☐	☐	☐			
			Combined total for all components				100%	4 hours

Change Control

What	When	Who
Attendance and Engagement, EDI and External Examiner updated	22/01/2025	A Adamson
Learning assessments updated	11/02/2025	N Ramzan