

Module Details	
Module Title	Artificial Intelligence and Data Science
Module Code	OIM7507-B
Academic Year	2021/2
Credits	20
School	School of Management
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Independent Study	158
Laboratories	12
Online Lecture (Synchronous)	24
Tutorials	3
Online Tutorials (Synchronous)	3

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims
<p>In this module, you will learn what Artificial Intelligence (AI) and Data Science (DS) are, explore use cases and applications of AI and DS, and understand AI and DS concepts and terms &lt;like machine learning, deep learning, natural language processing, and neural networks in AI and data collection, processing, analysis, and visualisation in DS&gt;. It will provide you with opportunities to critically reflect on the significance and impact of AI and DS within the workplace. You will be introduced to and gain knowledge of open source software and cloud-based services to use with data (such as Weka/Microsoft Azure/AWS Cloud Computing, among others).</p>

## Outline Syllabus

### Indicative Content:

- \* Fundamentals and core concepts in AI and DS: What are AI and DS?, The foundations of AI and DS, The history of AI and DS, The state of the art
- \* Intelligent Agents: Agents and environments, Good behaviour: The concept of rationality, The nature of environments, The structure of agents
- \* Machine learning: Unsupervised learning, Semi-supervised learning, Supervised learning, Reinforcement learning
- \* Fundamentals of deep learning and neural networks
- \* The data science process: setting the research goal, retrieving data, data preparation/data wrangling, data exploration, data modeling or model building, presentation and automation
- \* Cloud computing: principles, architectures, existing technologies; Microsoft Azure/AWS Cloud Computing
- \* Data science tools: Weka.

## Learning Outcomes

Outcome Number	Description
01	Demonstrate a systematic understanding of theoretical knowledge, and a critical awareness of current problems and/or new insights in AI and DS, along with their importance within organisations.
02	Demonstrate a comprehensive understanding of selected techniques in AI and DS and their application within organisations.
03	Demonstrate originality in the application of knowledge, together with a practical understanding of how established open source software and cloud-based services (such as Weka/Microsoft Azure/AWS Cloud Computing) are used to make sense of the data.
04	Demonstrate the qualities and transferable skills of decision-making in complex and unpredictable situations.

## Learning, Teaching and Assessment Strategy

Learning will be directed, supported, and reinforced through a combination of online lectures (synchronous and/or asynchronous), tutorials (online and face-to-face), online lab sessions, and discussion groups, as well as through directed and self-directed study.

Formal lectures will focus on the theoretical aspects and applications of AI and DS. Tutorials will engage students in active learning sessions which draw on and build upon the knowledge base acquired during the lectures to further deepen understanding. Lab sessions will complement formal lectures and tutorials and will be an opportunity for students to do some hands-on-system work, and practise using well-established tools (such as Weka/Microsoft Azure/AWS Cloud Computing). These activities may be based on case studies or problem-solving exercises.

Formative feedback will be provided during tutorials and lab sessions, especially during hands-on-system works and problem-solving exercises that involve the use of open source software and cloud-based services (such as Weka/Microsoft Azure/AWS Cloud Computing, among others). Furthermore, formative feedback will be provided on the draft outline of the summative assessment.

Students will be assessed based on an individual research report critically profiling the various AI methods in a given range of applied fields, in line with students' preferences and interests (which contributes 100% towards their module grade). Appropriate feedback, formative and summative, will be given for the assessment. The assessment will assess against all the learning outcomes specified in this document.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework	Individual report (3000 words) critically profiling the various AI and DS methods in a given range of applied fields.	100%

Reading List
To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a>

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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