Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	COM759
Module Title	Applied Data Science
Level	7
Credit value	20
Faculty	FACE
HECoS Code	100755
Cost Code	GACP

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Data Science and Big Data Analytics	Core
MSc Data Science and Big Data Analytics with Advanced Practice	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	11 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	10 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**21** hrs
Placement / work based learning	0 hrs
Guided independent study	179 hrs
Module duration (total hours)	**200** hrs

For office use only	
Initial approval date	08/11/2023
With effect from date	Sept 2024
Date and details of revision	
Version number	1

Module aims

This module aims to provide students with a hands-on understanding of various data analysis tools, programming tools, and techniques. It focuses on building proficiency in data cleaning, visualization, modelling and machine learning enable. Additionally, it encourages students to apply data science methods to different fields such as business, healthcare, finance or social sciences, enabling them to make informed decisions and derive actionable insights in a specific context.
This includes the exploration of how the data is gathered, processed, analysed and converted into knowledge, using various computational platforms. Students will explore big data applications and will learn how to responsibly design, build and maintain complex Big Data applications. Students will develop a critical awareness of the legal, ethical and environmental impacts of current and emerging big data technologies and applications.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Synthesise the concepts of Data Science and Big Data Analytics.
2	Analyse various Big Data technology infrastructures, platforms and applications.
3	Critically evaluate advanced Data Science concepts and practices in relation to Big Data Analytics.
4	Critically evaluate the security, legal, ethical and privacy issues in current and future Big Data application environments.

Assessment

Indicative Assessment Tasks:
This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

The assignments will aim to analyse the tools, technologies, infrastructure, platforms, and applications employed in data analytics across diverse industries and practices. Students will be tasked with referencing multiple case studies and conducting a critical evaluation of data science concepts and practices concerning big data analytics. They will be expected to formulate informed judgments by critically assessing the security, legal, ethical, and privacy implications of big data applications.

In the final element of the portfolio, students will be required to review various data science concepts and compose a written brief that synthesizes the relevant data science concepts and practices suitable for a specific industry. This exercise will facilitate the application of their knowledge in tailoring data science approaches to industry-specific requirements.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2,3,4	Portfolio	100%

Derogations

None

Learning and Teaching Strategies

In line with the Active Learning Framework, this module will be blended digitally with both a VLE and online community. Content will be available for students to access synchronously and asynchronously and may indicatively include first and third-party tutorials and videos, supporting files, online activities any additional content that supports their learning.
As this module progresses, the strategies will change to best support a diverse learning environment. For each week, a topic will be started with tutor-led demonstrations, and practical-based sessions will be given to ensure that the students get to practice what they have been taught in relevant concepts. Sessions will be intertwined between instructional explanation and practical depending on the specific indicated learning outcome.

Indicative Syllabus Outline

- Data Analytics.
  - Exploring the world of data analysis, including data collection, cleaning, and transformation.
  - Exploratory data analysis techniques and data visualization.
  - Statistical analysis methods for data interpretation and decision-making.
- Big Data Infrastructures, Platforms, Tools and Techniques.
  - Understanding the infrastructure requirements for handling Big Data.
  - Overview of Big Data platforms
  - Exploring tools and techniques for processing and analysing Big Data, including MapReduce and distributed computing.
- Data Science Applications
- Issues of current and emerging Big Data applications.
  - Legal and regulatory considerations related to Big Data and Data Science.
  - Ethical challenges and guidelines in handling sensitive data.
  - Security measures required to protect Big Data infrastructure and applications.
  - Privacy concerns and strategies for preserving data privacy.
  - Environmental implications and sustainability considerations in Big Data processing and storage.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

G. Aroraa, *Data Analytics: Principles, Tools, and Practices: A Complete Guide for Advanced Data Analytics Using the Latest Trends,* Tools and Technologies. 2022.

Other indicative reading

J.P. Isson, *Unstructured Data Analytics - How to Improve Customer Acquisition, Customer Retention, and Fraud Detection and Prevention.* CENGAGE Learning, 2018.

Journals (available electronically through the library) ACM Digital Library IEEE Xplore)