Module Specification

Module Summary Information

1	**Module Title**	Advanced Data Science
2	**Module Credits**	20
3	**Module Level**	7
4	**Module Code**	CMP7161

5	**Module Overview**

This module will equip students with the knowledge and skills for which employers are currently looking when recruiting for such roles as Data Scientist, Data Engineer, Data Architect, Business Insight Analyst, Business Consultant, Artificial Intelligence or Machine Learning Analyst. Students will learn methods for data pre-processing, analysis, management and visualisation; understand a wide range of algorithms to solve clustering, prediction and classification tasks; and practice programming them in Python. The course will also introduce the currently trending data science topics, such as deep learning, language and speech processing, and business intelligence.

The module will be delivered using both lectures and practical classes on a weekly basis. Additional resources will be available on Moodle and in the library for self-study. A substantial part of the learning process will take place whilst students are constructing their coursework solution. The coursework will involve formulating a research problem, finding suitable datasets and developing a data analytics solution to address the problem. The assessment of the coursework will consist of evaluating in-person project presentation, submitted project report, data set, and programming scripts. It will demonstrate the extent to which students have successfully fulfilled the learning outcomes and developed an analytical solution for their identified research problem.

6	**Indicative Content**

- Data Science concepts and tools
- Programming for Data Science
- Data pre-processing and visualisation
- Algorithms for classification, regression and clustering
- Building ML predictive models
- Deep Learning
- Natural Language Processing
- Business Intelligence

7	Module Learning Outcomes On successful completion of the module, students will be able to:	
	1	Compare the different aspects involved in the modern Data Science.
	2	Critically evaluate and practice implementing a wide range of algorithms and modern tools used to solve various data science tasks.
	3	Apply learned techniques to formulate and solve real-life data-based problems.
	4	Communicate technical information in a range of formats appropriate to a specific audience.

8	Module Assessment		
Learning Outcome			
	Coursework	**Exam**	**In-Person**
1-2	X (In-Class Quizzes)		
1-4			X (Oral Presentation)
1-4	X (Written Technical Report (4000 words) and Coding Scripts)		

9	Breakdown Learning and Teaching Activities
Learning Activities	**Hours**
Scheduled Learning (SL) includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable	48
Directed Learning (DL) includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE	52
Private Study (PS) includes preparation for exams	100
Total Study Hours:	200