This Version is No Longer Current
The latest version of this module is available here

MODULE DESCRIPTOR

Module Title

Advanced Data Science

Reference	CMM536	Version	4
Created	April 2017	SCQF Level	SCQF 11
Approved	April 2015	SCQF Points	15
Amended	August 2017	ECTS Points	7.5

Aims of Module

To introduce the students to real-time analysis of streaming data, showing how data mining techniques can be adapted to address the challenges posed by the streaming nature of some applications.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Critically appraise the challenges posed by the streaming of data.
2	Discuss, compare and contrast advanced data stream mining techniques.
3	Apply data stream mining techniques and analyse the results.
4	Compare and contrast state-of-the-art data science techniques and applications.

Indicative Module Content

1. Fundamentals of data stream mining: mining strategies and change detection methods. 2. Hoeffding-bound and windowing techniques for data streams: Hoeffding bound as a generic method to data stream mining, and the concept of window-based mining. 3. Stationary data stream mining techniques: mining in a setting where the data source generates a stable distribution of the data. 4. Evolving data stream mining techniques: mining in a setting where concept drift is anticipated. 5. Application of streaming techniques to social media generated data 6. State-of-the-art in data science

Module Delivery

This is a lecture-based module with practical exercises that will feature a number of advanced data mining techniques as applied in real-time for high-speed data streams. Online materials and online sessions will be used to support DL students.

Module Ref:	CMM536 v4

Indicative Student Workload	Full Time	Part Time
Contact Hours	33	33
Non-Contact Hours	117	117
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Data stream mining project				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

There is one coursework which contributes 100% to the module total. This coursework will assess students ability in applying advanced data science techniques to solve real life problems (i.e. stream mining clustering, classification, ensemble classification and others). The coursework is made of several elements, each assessing a particular learning outcome. The student has to achieve grade D to pass this module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	The student needs to achieve A in component 1.
B	The student needs to achieve B in component 1.
C	The student needs to achieve C in component 1.
D	The student needs to achieve D in component 1.
E	The student needs to achieve E in component 1.
F	The student needs to achieve F in component 1.
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	AGGARWAL, C. C. (2007). Data streams: models and algorithms (Vol. 31). Springer.
2	GAMA, J. and GABER, M. M. (2007). Learning from data streams. Springer-Verlag Berlin Heidelberg.
3	Python, Toby Donaldson, Peachpit Press (2013)
4	Python Essentials. Steven F. Lott, Packt Publishing Ltd(2015)
5	Think Python: How to Think Like a Computer Scientist. Allen Downey, O'Reilly Media, Inc. (2012)
6	Fluent Python. Luciano Ramalho. O'Reilly Media, Inc. (2015)
7	Python Cookbook: Recipes for Mastering Python 3. David Beazley, Brian K. Jones, O'Reilly Media, Inc. (2013)
8	Deep Learning with Python. Francois Chollet. Manning. (2018)