STUDENT AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Information			
Module Title	Machine Learning and Predictive Analytics		
Module Code	UFCFMJ-15-M	Level	Level 7
For implementation from	2018-19		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Computer Science and Creative Technologies
Department	FET Dept of Computer Sci & Creative Tech		
Contributes towards	Creative Technology [Sep][PT][Frenchay][2yrs] MSc 2018-19 Information Management [Sep][FT][Frenchay][1yr] MSc 2018-19 Information Technology [Sep][FT][Frenchay][1yr] MSc 2018-19 Creative Technology [Sep][FT][Frenchay][1yr] MSc 2018-19		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
Educational Aims: See Learning Outcomes.   **Outline Syllabus:** You will cover: Introduction to predictive analytics: Defining predictive analytics - introduction   Business Relevance of PA - Business intelligence and applications: Relevance of pattern recognition, classification, optimisation

Predictive analytics and big data
Case study: a business application using predictive analytics approaches

Predictive analytics in business - applications:
Sources of data and value of knowledge

Identify a wide range of applications for predictive analytics:
Marketing and recommender systems, fraud detection, business process analytics, credit risk modelling, web analytics and others
Social media and human behaviour analytics

Case study: email targeting - which message will a customer answer? - (tutorial)

Analytics models and techniques:
Introduction to analytics modelling

Types of analytics models:
Predictive models
Survival models
Descriptive models

Define pattern recognition, inferring data and data visualisation
Briefing learning and regression approaches
Comparison of approaches - use and goals - (tutorial)

Introduction to machine learning:
Introduction: Basic principles:
Basic notions of learning
Introduction to learning problems (classification, clustering and reinforcement) and literature
Identifying different learning approaches - supervised, unsupervised and reinforcement

Case study on different types of learning - (tutorial)

Machine learning for predictive analytics (1):
Review of types of problems

Machine Learning techniques:
Decision tree learning
Artificial neural networks
Clustering
Naive Bayes classifier
k-nearest neighbours
Genetic algorithms

Case study on problem - a "suitable" predictive modelling technique - (tutorial)

Regression techniques for predictive analytics:
Review of types of problems (application)
Linear regression models
Survival or duration analysis (time to event analysis)
Ensemble learning and random forest
Case study on problem - a "suitable" predictive modelling technique - (tutorial)

Advanced topics and Software tools:
Analytics in the context of big data
Predictive analytics as art and science
Software tools; the R project and Python

Trends and challenges in predictive analytics - where are we going?

Teaching and Learning Methods: See outline syllabus and assessment.

Part 3: Assessment

The Component B, coursework involves solving a business related problem based on given requirements and data, proposing a solution and preparing a pilot predictive model. This component brings together module material on the context, data and requirements for implementing a predictive module and in the course of completion students will gain experience in model building, presenting results and evaluating accuracy.

The component A grade will be obtained from an exam to be taken at the completion of teaching. This component will consist of a number of questions which should test the students understanding of the fundamental concepts presented in the course materials as well as their understanding and ability to selectively apply those concepts and ideas to real-life scenarios (case studies).

There will be opportunities for formative assessment in the form of regular in-class presentations of research/implementation completed as part of tutorial work completed, group discussions, and progress reviews of the coursework project.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component B		50 %	Individual coursework report (2000 words)
Examination - Component A	✓	50 %	Examination (3 hours)
Resit Components	Final Assessment	Element weighting	Description
Report - Component B		50 %	Individual coursework report (2000 words)
Examination - Component A	✓	50 %	Examination (3 hours)

Part 4: Teaching and Learning Methods	
Learning Outcomes	On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	Define and critique through example the concepts of predictive analytics, machine learning and data mining
MO2	Differentiate analytical models: the predictive, descriptive and survival
MO3	Synthesise evidence on the value of data as an asset for businesses to "mine" knowledge and "predict" trends
MO4	Identify learning problems including classification, clustering and reinforcement; distinguish their scope and outline suitable solutions
MO5	Develop and evaluate predictive analytics approaches and techniques such as regression and random forest classifiers
MO6	Apply problem solving skills necessary for identifying the organisational capacity needed to employ a predictive analytics solution
MO7	Visualise and present the results of predictive and descriptive models alongside an evaluation of performance and recommendations for improvement
MO8	Understand predictive analytics trends and challenges and illustrate fluency with software tools used in predictive analytics

Contact Hours	Contact Hours	
		4
	Independent Study Hours:	
	Independent study/self-guided study	126
	Total Independent Study Hours:	126
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	24
	Total Scheduled Learning and Teaching Hours:	24
	Hours to be allocated	150
	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ufcfmj-15-m.html	