H8SDA: Strategic Data Analysis

Module Code:	H8SDA
Long Title	Strategic Data Analysis APPROVED
Title	Strategic Data Analysis
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	10
Module Coordinator:	Ade Fajemisin
Module Author:	Ade Fajemisin
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Master's degree or PhD in a computing or cognate discipline. May have industry experience also.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Illustrate the relationship between decisions and data
LO2	Demonstrate how to use data to help understand and manage the business on a strategic level
LO3	Define how uncertainty can be incorporated into decisions
LO4	Analyse and discuss how people perceive and decide about risk
LO5	Use analytical and problem-solving skills in decision making
LO6	Demonstrate, in oral and written form, the skills and attributes of effective decision makers in applying the knowledge and techniques of decision making to case studies and other real-world contexts

Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	Learners should have attained the knowledge, skills and competence gained from stage 3 of the BSc (Hons) in Data Science

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Module Content & Assessment

Indicative Content

Probabilistic modelling: From Data to a Decisive Knowledge
Probabilities and conditional probabilities, random variables

Probabilistic graphical models
Representation and types

Bayesian networks applied to decision making
Introduction, Naive Bayes classifier, Kalman filter

Learning Bayesian networks from data for decision making
Inference and learning

Decision making under risk and uncertainty
Risk management, Representation of Conditional Preferences Under Uncertainty

Decision Trees
Decision tree analysis in risk management

Markov decision processes
Model Formulation, Finite-Horizon Markov Decision Processes, Infinite-Horizon Models: Foundations, Average Reward and Related Criteria

Multicriteria decision making 1
Multi-attribute utility theory

Multicriteria decision making 2
Outranking methods

Introduction to social choice theory
Group decision making, voting system, computational social choice

Introduction to multiobjective optimisation
Pareto dominance, exact method, heuristics

Case studies
Medical diagnosis, clinical decision support. Ethics aspects

Assessment Breakdown	%
Coursework	30.00%
End of Module Assessment	70.00%

Assessments

Full Time

Coursework

Assessment Type:	Continuous Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4,5,6
Non-Marked:	Yes		

Assessment Description:
Ongoing independent and group problem solving activities and feedback.

Assessment Type:	Continuous Assessment	**% of total:**	30
Assessment Date:	n/a	**Outcome addressed:**	1,2,3
Non-Marked:	No		

Assessment Description:
This assessment will evaluate learner's comprehension of fundamental data analysis theory and concepts, and their applicability to problems with uncertainty. In addition, learners will be required to propose and document a solution approach to a problem with uncertainty

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	70
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3,4,5,6
Non-Marked:	No		

Assessment Description:
Terminal exam with five questions of which the student must answer four to address the students' understanding of the underlying theories and concepts

No Workplace Assessment

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

Reassessment Description
The repeat strategy for this module is an examination. All learning outcomes will be assessed in the repeat exam.

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Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Classroom & Demonstrations (hours)	24	Per Semester	2.00
Tutorial	Other hours (Practical/Tutorial)	24	Per Semester	2.00
Independent Learning	Independent learning (hours)	202	Per Semester	16.83
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

Bernard, M,. (2017), Data Strategy: How to profit from a world of big data, analytics and the internet of things, Kogan Page Ltd.

Provost, F. & Fawcett, T.. (2013), Data Science for Business, O'Reilly Media.

Kochenderfer, M. J. & Amato, C.G.,. (2015), Decision Making Under Uncertainty – Theory and Application, MIT Press.

Koski, T. & Noble, J.. (2009), Bayesian Networks: An Introduction, Wiley.

Triantaphyllou, E.. (2001), Multi-criteria decision making methods: a comparative study, Kluwer Academic.

Supplementary Book Resources

Levenson, A.. (2015), Strategic Analytics: Advancing Strategy Execution and Organizational Effectiveness, Berrett-Koehler Publishers.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note: