H8HA: Healthcare Analytics

Module Code:	H8HA
Long Title	Healthcare Analytics APPROVED
Title	Healthcare Analytics
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	10
Module Coordinator:	Anu Sahni
Module Author:	Catherine Mulwa
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	Discuss techniques for improving efficiency in a variety of settings (hospitals, primary care, and private sector) and the associated tradeoffs.
LO2	Conduct advanced data analysis tasks, including data preparation, inspection, cleansing and transformation with the goal of discovering useful information.
LO3	Design and develop optimisation and simulation models to evaluate and improve health care operations.
LO4	Effectively interpret model output to assess processes and outcomes of care and the potential impact of proposed changes on healthcare systems performance.
LO5	Critically evaluate healthcare models and systems (i.e. creative analysis of findings, demonstrate ability to synthesise data collected).

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

H8HA: Healthcare Analytics

Module Content & Assessment

Indicative Content
Introduction to Healthcare Industry Various constituents. The current state of healthcare – cost, process, structure, quality. Challenges . Latest development in this area. Impact of technology.
Data Sources and Healthcare Analytics Electronic Health Records, Imaging, Sensor data, Biomedical signals.. Common representations of data in health information systems (ICD, CPT). How Analytics Can Improve Decision Making . Existing quality/performance measurement frameworks (NQF, HEDIS). Applications of Healthcare Analytics . Attributes of high-performing healthcare systems. Components of Healthcare Analytics
Healthcare Quality and Value Overview of Healthcare QI . Common QI Frameworks in Healthcare . Working with QI Methodologies. Strategies for optimizing data quality. Querying tools and methods. Data preparation/transformation. Ethics, data ownership and privacy
Data Quality and Governance The Need for Effective Data Management . Data Quality . Data Governance and Management
Working with Data Data: The Raw Material of Analytics . Preparing Data for Analytics . Getting Started with Analysing Data
Developing and Using Effective Indicators Measures, Metrics, and Indicators . Using Indicators to Guide Healthcare. Improvement Activities
Data Mining Healthcare Applications Introduction. Association Analysis. Pattern Mining. Sensor Data Analysis. Terminology Acquisition and Management. Information Extraction. Discourse Interpretation. Text Mining Environments. Applications. Integration with Clinical Text Mining.
Healthcare Optimisation Modelling and simulation . Design space exploration. Simulated annealing. Multi-objective optimization. Resource allocation . Hospital staff scheduling Patient flow optimization.
Healthcare Policies and Ethical Approval Procedure in Ireland Understanding the benefits and significance of healthcare policies In Ireland. Ethical approval process e.g. Dataset privacy . .

Assessment Breakdown	%
Coursework	100.00%

Assessments

Full Time

Coursework

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

Assessment Description:
Ongoing weekly feedback on tutorial activities.

Assessment Type:	Continuous Assessment	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	1,2
Non-Marked:	No		

Assessment Description:
The learner will be required to discuss techniques for improving efficiency in a variety of settings (i.e. hospitals, primary care, and private sector) and the associated tradeoffs. Select a particular area in healthcare, find datasets, utilize data mining and machine learning techniques and perform data analyses tasks (i.e. data pre-processing, inspection, cleansing and transformation) with the goal of discovering useful information

Assessment Type:	Project	**% of total:**	60
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4,5
Non-Marked:	No		

Assessment Description:
Specify, Design and develop an optimisation or simulation model to evaluate and improve healthcare operations. Based on developed model, the learner will be required to effectively interpret and communicate results of model output assess processes and outcomes of care.

No End of Module Assessment

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 a project. Learners will be afforded an opportunity to repeat the project at specified times throughout the year and all learning outcomes will be assessed in the repeat project.

H8HA: Healthcare Analytics

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

Yang, H. & Lee, E. K.. (2016), Healthcare Analytics: From Data to Knowledge to Healthcare Improvement, Wiley Series.

Reddy, C. K. & Aggarwal, C. C.. (2015), Healthcare Data Analytics, Chapman and Hall/CRC.

Strome, T.. (2013), Healthcare analytics for quality and performance improvement, Wiley & Sons.

Story, P.. (2010),) Dynamic Capacity Management for Healthcare: Advanced Methods and Tools for Optimization, CRC Press.

Supplementary Book Resources

Nadinia, D. & Melissa, L.. (2016), Foundations of Health Information Management, (4th ed).

Hokey, M.. (2016), Global Business Analytics Models: Concepts and Applications in Predictive, Healthcare, Supply Chain, and Finance Analytics (FT Press Analytics).

David, M.. (2010), Data Analytics in Healthcare Research: Tools and Strategies.

Shilpa, B.. (2017), Business Intelligence in Healthcare with IBM Watson Analytics.

Madsen, L.. (2012), Healthcare Business Intelligence: A Guide to Empowering Successful Data Reporting and Analytics, John Wiley & Sons.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note:	