UNIVERSITI TEKNOLOGI MARA

DSC722: RESEARCH METHODOLOGY

Course Name (English)	RESEARCH METHODOLOGY APPROVED
Course Code	DSC722

MQF Credit	3

Course Description	Data Science is a multidisciplinary field involving database technology, computer science, mathematics, statistics, operations research, and information science for knowledge discovery in large databases. This course aims to provide the necessary scientific knowledge for researching the field of data science. The syllabus is designed to facilitate students to manage their research projects successfully. The topics of specific areas and trends in data. The areas include business intelligence, machine learning algorithms, big data analytics, and optimization and decision support systems. Students will learn innovative ways of harnessing data to transform knowledge and optimize processes in the 21st century.

Transferable Skills	Problem-solving skills developed through case studies

Teaching Methodologies	Lectures

CLO	CLO1 Analyze past and current studies on data science methods
	CLO2 Demonstrate the use of data science methodology to solve some case study data
	CLO3 Evaluate the applications of the various data science techniques
	CLO4 Report through a presentation of the solution from the case study

Pre-Requisite Courses	No course recommendations

Topics
1. Overview of Research 1.1) A research concept 1.2) Why do research? 1.3) What makes a good research? 1.4) Research vs. Development 1.5) Research in Data Science
2. Research Process 2.1) Identifying research area 2.2) Constructing Problem Statement 2.3) Literature Reviews 2.4) Research Design 2.5) Measurement & Data Gathering 2.6) Data Analysis & Reporting
3. Problem Formulation 3.1) Formulating the problem 3.2) Research Questions 3.3) Research Objectives 3.4) Hypothesis
4. Literature Review 4.1) Methods to search for articles 4.2) Summarising past studies. 4.3) Synthesizing past research 4.4) Citing articles 4.5) Developing a conceptual model/theoretical framework

5. Research Methodology
5.1) Data Science Approach
5.2) Empirical Approach
5.3) Qualitative Approach
5.4) Formal Method Approach

6. Data Science Methodology
6.1) Forming a business or research problem
6.2) Data Understanding
6.3) Data Preparation
6.4) Data Modeling
6.5) Model Evaluation
6.6) Model Deployment
6.7) Case Study

7. Research Tools
7.1) R
7.2) SAS Enterprise Miner
7.3) PYTHON
7.4) WEKA
7.5) LATEX
7.6) IBM SPSS STATISTICS 22
7.7) IBM SPSS Modeler 15
7.8) FUSIONEX-GIANT
7.9) MICROSOFT AZURE-ML

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Case Study	Case study 1 (30%) from various applications of data science to solve with data science techniques.	30%	CLO3
	Case Study	Final Assessment - Case study 2 (30%) based project to demonstrate practicality of methodology in data science	30%	CLO2
	Presentation	Presentation (20%) of the case study to indicate communication skills	20%	CLO4
	Reading Response	Review related studies (20%) in data science methods to capture knowledge	20%	CLO1

Reading List	Recommended Text	**Ranjit, K 2019, *Research Methodology: A Step-by-Step Guide for Beginners*, Fifth Edition Ed., SAGE Publications Ltd. [ISBN: 978-152644990]**
	Reference Book Resources	**Creswell, J. W., & Creswell, J. D. 2018, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Fifth Edition Ed., SAGE Publications, Inc. United States of America [ISBN: 978-150638670]**
		Turabian, K. L. 2018, *A Manual for Writers of Research Papers, Theses, and Dissertations*, Ninth Edition Ed., University Of Chicago Press. [ISBN: 978-022643057]
		Oliver ,T. 2018, *The Literature Review: A Step-by-Step Guide for Students*, Second Edition Ed., Oliver Theobald [ISBN: 978-154961721]
		Sarma, K. S. 2018, *Predictive Modeling with SAS Enterprise Miner: Practical Solutions for Business Applications*, Third Edition Ed., SAS Institute [ISBN: 978-162960264]
		Saltz, J. S. & Stanton, J. M 2017, *An introduction to data science*, First Edition Ed., SAGE Publications, Inc. [ISBN: 978-150637753]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	