Module Details

Module Code:	MATH C7001
Full Title:	Data Analysis for Computing APPROVED
Valid From::	Semester 1 - 2019/20 (June 2019)
Language of Instruction:	English
Duration:	1 Semester
Credits::	5
Module Owner::	Gabriel Matthews
Departments:	Unknown
Module Description:	This module aims to develop the students' problem-solving skills by introducing them to the key role of descriptive statistics and probability in the solution of practical problems. In addition, the interpretation of statistical data and decision making under uncertainty are key transferable business skills which the student will be exposed to in this module.

Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	**Module Learning Outcome Description**
MLO1	Calculate, present and interpret numerical and graphical summaries of statistical data.
MLO2	Demonstrate an understanding of basic probability theory and be able to apply probability in the solution of practical problems in computing.
MLO3	Recognise the appropriate probability distribution to model different problems and be able to compute probabilities for Binomial, Poisson & Normal distributions.
MLO4	Construct and use decision trees and Bayes' Theorem as an aid to fault finding and problem solving.
MLO5	Perform correlation and simple linear regression analyses.
MLO6	Use an appropriate software tool for compiling descriptive statistics and graphs and calculating probabilities.

Pre-requisite learning
Module Recommendations
This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named DkIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).
No recommendations listed

Module Indicative Content	
Descriptive Statistics Tally charts and frequency distributions. Symmetrical and Skewed Distributions. Barcharts, histograms, boxplots, dotplots. Measures of central tendency and dispersion including five-number summaries.	
Probability Theory Approaches to probability. Events, sample spaces and axioms of probability. Addition and multiplication laws. Normal, hypergeometric, binomial and poisson models. Computer simulations of probabilities and sampling variation. Normal probability plots.	
Conditional probability Bayes theorem, decision trees.	
Probability Distributions Random variables. Probability distributions and densities. Binomial, Poisson and Normal models.	
Regression Analysis Scatterplots, Correlation & Simple Linear Regression Analysis.	
Excel Investigation & use of some of the graphical & statistical functionality in excel. Calculating and simulating probabilities.	

Module Assessment

Assessment Breakdown	%
Course Work	40.00%
Final Examination	60.00%

Module Special Regulation

Assessments

Full Time On Campus

Course Work			
Assessment Type	Other	**% of Total Mark**	10
Marks Out Of	100	**Pass Mark**	40
Timing	Week 6	**Learning Outcome**	1,2,6
Duration in minutes	50		
Assessment Description An in-class lab test which will require students to use appropriate software tool to implement elements of exploratory data analysis.			
Assessment Type	Class Test	**% of Total Mark**	20
Marks Out Of	0	**Pass Mark**	0
Timing	Week 9	**Learning Outcome**	1,2,3,4,6
Duration in minutes	55		
Assessment Description The student will be required to sit a one-hour written class assessments covering the theoretical elements of the course			
Assessment Type	Other	**% of Total Mark**	10
Marks Out Of	100	**Pass Mark**	40
Timing	Week 12	**Learning Outcome**	1,2,3,5,6
Duration in minutes	60		
Assessment Description An in-class lab test which will require students to use an appropriate software tool to calculate probabilities an carry out a regression analysis.			

No Project

No Practical

Final Examination			
Assessment Type	Formal Exam	**% of Total Mark**	60
Marks Out Of	100	**Pass Mark**	40
Timing	End-of-Semester	**Learning Outcome**	1,2,3,4,5
Duration in minutes	120		
Assessment Description End-of-Semester Final Examination			

Part Time On Campus

Course Work			
Assessment Type	Other	**% of Total Mark**	10
Marks Out Of	100	**Pass Mark**	40
Timing	Week 6	**Learning Outcome**	1,2,6
Duration in minutes	50		
Assessment Description An in-class lab test which will require students to use appropriate software tool to implement elements of exploratory data analysis.			
Assessment Type	Class Test	**% of Total Mark**	20
Marks Out Of	100	**Pass Mark**	40
Timing	Week 9	**Learning Outcome**	1,2,3,4,6
Duration in minutes	55		
Assessment Description The student will be required to sit a one-hour written class assessments covering the theoretical elements of the course			
Assessment Type	Other	**% of Total Mark**	10
Marks Out Of	100	**Pass Mark**	40
Timing	Week 12	**Learning Outcome**	1,2,3,5,6
Duration in minutes	50		
Assessment Description An in-class lab test which will require students to use an appropriate software tool to calculate probabilities and carry out a regression analysis.			

No Project

No Practical

Final Examination

Assessment Type	Formal Exam	**% of Total Mark**	60
Marks Out Of	100	**Pass Mark**	40
Timing	End-of-Semester	**Learning Outcome**	1,2,3,4,5
Duration in minutes	120		

Assessment Description
End-of-Semester Final Examination

Reassessment Requirement

A 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.

Module Workload

Workload: Full Time On Campus

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Interactive student-centred lectures.	Every Week	2.00	2
Tutorial	Contact	Weekly exercise classes.	Every Week	1.00	1
Practical	Contact	Weekly lab-based exercises involving the use of an appropriate software tool.	Every Week	1.00	1
Independent Study	Non Contact	Students will be expected to conduct independent review of content & research related topics	Every Week	2.00	2
Directed Reading	Non Contact	Guided Preparation for lectures & labs, including the completion of exercises.	Every Week	2.00	2
				Total Weekly Learner Workload	8.00
				Total Weekly Contact Hours	4.00

Workload: Part Time On Campus

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Interactive student-centred lectures.	Every Week	2.00	2
Tutorial	Contact	Weekly exercise classes.	Every Week	1.00	1
Practical	Contact	Weekly lab-based exercises involving the use of an appropriate software tool.	Every Week	1.00	1
Independent Study	Non Contact	Students will be expected to conduct independent review of content & research related topics	Every Week	2.00	2
Directed Reading	Non Contact	Guided Preparation for lectures & labs, including the completion of exercises.	Every Week	2.00	2
				Total Weekly Learner Workload	8.00
				Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

Diez, David and Cetinkaya-Rundel Mine. (2017), OpenIntro Statistics, 3rd. 1-3,7, Creative Commons License, 1 - 157 and 315 - 330.

Supplementary Book Resources

Weiss, N.. (2011), Introductory Statistics, 9th edition. Pearson, [ISBN: 978032169794].

Milton, J.C., Arnold, J.S.. Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences ISBN: 007246836X, Addison-Wesley, 2003.

Tufte, E.. The Visual Display of Quantitative Information. ISBN: 0961392142, Graphics Press, 2001.

This module does not have any article/paper resources

Other Resources

website, Wolfram Inc.. MathWorld Probability,
http://mathworld.wolfram.com/Probability .html

website, Khan Academy,
http://www.khanacademy.org/math/probabil ity

website, Seeing Statistics,
http://www.seeingstatistics.com

website, Diez, David and Cetinkaya-Rundel Mine,,
'OpenIntro', https://www.openintro.org/