

H8ABDA: Advanced Business Data Analysis

Module Code:	H8ABDA
Long Title	Advanced Business Data Analysis APPROVED
Title	Advanced Business Data Analysis
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	5
Module Coordinator:	Margarete Silva
Module Author:	EUGENE O'LOUGHLIN
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
#	Learning Outcome Description
LO1	Evaluate and choose between different options for inference statistics so that a motivated decision between two or more options can be made
LO2	Critically evaluate statistical applications in a particular discipline using advanced topics (Power analysis, sample size calculation, cluster and factor analysis)
LO3	Conduct advanced statistical analyses using a statistical package (e.g. SPSS/SAS)
LO4	Interpret the results output of a statistical package (e.g. SPSS/SAS)
LO5	Work out and apply a strategy for a statistical analysis when presented with a real-world problem from business
Dependencies	
Module Recommendations	
19343	H8BDA1 Business Data Analysis
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	

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Module Content & Assessment			
Indicative Content			
Introduction 10% Inferential Statistics Revisited, The R Programming Language, Statistical Tools (eg SPSS)			
Reporting Results (10%) Stating Hypotheses, Making decisions, p values, Visuals (eg Boxplots)			
Tests for Normality (10%) Normal distributions, Q-Q/P-P Plots, Shapiro-Wilk Test, Kolmogorov-Smirnov Test			
Analysis of Variance (10%) One-way ANOVA, Two-Way ANOVA, Post-hoc Tests			
Regression (10%) Simple Linear Regression, Multiple Linear Regression, Forecasting			
Non-parametric statistical tests (15%) Mann-Whitney Test, Wilcoxon Sign-Rank Test, Kruskal-Wallis Test, Chi-Square Test			
Time Series Analysis (10%) Smoothing data, ARIMA (Seasonal, Non-seasonal)			
Meaningful data reports (10%) Sample size, Confidence intervals, Effect size, Power, Cohen's d			
Factor Analysis (15%) Data reduction, Cross correlation, Principal Component Analysis, Eigenvalues, Clusters			
Assessment Breakdown			%
Coursework			50.00%
End of Module Assessment			50.00%
Assessments			
Full Time			
Coursework			
Assessment Type:	Assignment 1	% of total:	25
Assessment Date:	n/a	Outcome addressed:	1,2,3,4,5
Non-Marked:	No		
Assessment Description: In this assignment you will prepare a report based on three statistical tests: • Student's t-Test (Paired or Unpaired) • One-way ANOVA (including TukeyHSD if appropriate) • Two-way ANOVA Each test should be completed in Excel, SPSS, and R. Data. For this assignment you will source your own data. You may collect your own data if you wish, or use third-party data available online or in the literature. Each dataset should be at least 50 records - more than 100 records is not required. You may extract samples from larger datasets if you wish. Make sure you cite sources of data. You may not use data from sample files used in the Business Data Analysis or the Advanced Business Data Analysis			
Assessment Type:	Assignment 2	% of total:	25
Assessment Date:	n/a	Outcome addressed:	3,4
Non-Marked:	No		
Assessment Description: In this assignment you will use statistical tests for non-normal data. You may use methods (non-parametric statistics tests) and tools (R, Excel, or SPSS) of your own choice - please don't rely on one tool or method, variety is expected. It is not necessary to replicate any test you carry out, ie if you perform a test in R it is not necessary to repeat in SPSS and/or Excel. A data file (from the 2011 Census of Ireland) is suggested, though students are permitted to choose a different file if they wish (subject to approval by Lecturer). Your task is to prepare a statistical report based on the data in the file.			
End of Module Assessment			
Assessment Type:	Terminal Exam	% of total:	50
Assessment Date:	End-of-Semester	Outcome addressed:	1,2,3,4,5
Non-Marked:	No		
Assessment Description: The end of semester examination paper which is two hours in duration usually contains three questions, with students required to answer two of the three questions. Question format will usually be of essay-style but may also include other formats (e.g., a plan for an extended business data analysis project or a technical figure). Marks will be awarded based on clarity, structure relevant examples, depth of topic knowledge and an understanding of the potential and limits of solutions			
No Workplace Assessment			
Reassessment Requirement			
Repeat examination <i>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.</i>			

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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	No Description	2	Every Week	2.00
Tutorial	No Description	1	Every Week	1.00
Independent Learning Time	No Description	7.5	Every Week	7.50
Total Weekly Contact Hours				3.00
Workload: Part Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	No Description	2	Every Week	2.00
Tutorial	No Description	1	Every Week	1.00
Independent Learning Time	No Description	89	Every Week	89.00
Total Weekly Contact Hours				3.00

Module Resources	
<i>Recommended Book Resources</i>	
<p>Andy Field. (2013), <i>Discovering Statistics Using IBM SPSS Statistics</i>, 4th. Sage Publications Inc, London, [ISBN: 9781446249].</p> <p>Peter Dalgaard. <i>Introductory Statistics with R</i>, Springer, p.364, [ISBN: 0387790535].</p> <p>John Maindonald. (2008), <i>Using R for data analysis and graphics</i>. Introduction, code and commentary, http://cran.r-project.org/doc/contrib/usingR.pdf.</p>	
<i>Supplementary Book Resources</i>	
<p>Cortinhas, C. and Black, K.. (2012), <i>Statistics for Business and Economics</i>, 1st European Edition edition. John Wiley & Sons, [ISBN: 1119993660].</p> <p>EMC Education Services. (2015), <i>Data Science and Big Data Analytics</i>, John Wiley & Sons, Incorporated, [ISBN: 111887613X].</p> <p>John W. Foreman.. (2013), <i>Data Smart: Using Data Science to Transform Information into Insight</i>, Chichester; John Wiley and Sons, [ISBN: 111866146X].</p> <p>Neil Salkind. (2014), <i>Statistics for People Who (Think They) Hate Statistics</i>, 5th. Sage, [ISBN: 9781452277].</p>	
<i>This module does not have any article/paper resources</i>	
<i>Other Resources</i>	
<p>[Website], The Khan Academy. http://www.khanacademy.org/.</p> <p>[Website], Learn with Dr Eugene O'Loughlin. http://www.youtube.com/eoloughlin.</p> <p>[Website], Central Statistics office. http://www.cso.ie.</p> <p>[Website], Glossary of Statistical Terms. http://bit.ly/LIRYpQ.</p> <p>[Website], HyperStat Online Statistics Textbook. http://davidmlane.com/hyperstat/.</p> <p>[Website], The R Project for Statistical Computing. http://www.r-project.org/.</p>	
Discussion Note:	