APPROVED

STAT7009: Inferential Statistics

Module Details

Module Code:	STAT7009
Title:	Inferential Statistics APPROVED
Long Title:	Inferential Statistics
NFQ Level:	Intermediate
Valid From:	Semester 1 - 2019/20 (September 2019)

Duration:	1 Semester

Credits:	5

Field of Study:	4620 - Statistics

Module Delivered in:	**4 programme(s)**

Module Description:	This module will develop the learner's ability to analyse and understand data through the use of sampling theory and inferential statistics. The emphasis will be practical and will be assisted by a statistical software package.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Generate confidence interval estimates for means, variances and proportions.
LO2	Conduct a variety of hypothesis tests on population parameters.
LO3	Understand the concept of uncertainty in scientific measurements.
LO4	Construct and interpret control charts for variables and attributes.
LO5	Use a statistical software package to carry out hypothesis testing.

Dependencies		
Module Recommendations		
13573	STAT6014	Intro Stats for Phys. Sc.
Incompatible Modules		
No incompatible modules listed		
Co-requisite Modules		
No Co-requisite modules listed		
Requirements		
No requirements listed		

Indicative Content
Sampling Sample statistics and sampling distributions for proportions, means and variances. Central Limit Theorem.
Statistical Inference Confidence intervals for proportions, means and variances. One and two sample hypothesis tests for means, proportions and variances. Chi-square test of independence.
Control Charts Construction and interpretation of charts for variable data and for attribute data. Process capability, capability indices.
Measurement Uncertainty Understand the concepts of systematic and random errors in measurement. Repeatability and reproducibility of measurements.
Software Analysis The use of statistical software in the application of the various statistical procedures dealt with in the module will be illustrated through a suitable package e.g. Minitab, R, SPSS.

Module Content & Assessment

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

Assessments

Coursework			
Assessment Type	Short Answer Questions	**% of Total Mark**	15
Timing	Week 7	**Learning Outcomes**	1,2,4
Assessment Description In-class assessment			
Assessment Type	Practical/Skills Evaluation	**% of Total Mark**	15
Timing	Week 12	**Learning Outcomes**	1,2,4,5
Assessment Description Statistical software lab assessment			

End of Module Formal Examination			
Assessment Type	Formal Exam	**% of Total Mark**	70
Timing	End-of-Semester	**Learning Outcomes**	1,2,3,4
Assessment Description End of Semester Final Examination			

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.*

Module Workload

Workload: Full Time

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Formal lecture	Every Week	3.00	3
Lab	Contact	Case study analysis using statistical software	Every Week	1.00	1
Independent & Directed Learning (Non-contact)	Non Contact	Study, Solving sample problems	Every Week	3.00	3
				Total Hours	7.00
				Total Weekly Learner Workload	7.00
				Total Weekly Contact Hours	4.00

Workload: Part Time

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Formal Lecture	Every Week	2.00	2
Lab	Contact	Analysis using statistical software	Every Week	1.00	1
Independent & Directed Learning (Non-contact)	Non Contact	Study, Solving sample problems	Every Week	4.00	4
				Total Hours	7.00
				Total Weekly Learner Workload	7.00
				Total Weekly Contact Hours	3.00

Module Resources

Recommended Book Resources

James Miller, Jane Miller. (2010), Statistics and Chemometrics for Analytical Chemistry, [ISBN: 0273730428].

Currell, Graham; Dowman, Antony. (2009), Essential Mathematics and Statistics for Science, [ISBN: 0470694483].

Supplementary Book Resources

Michael Sullivan III. (2017), Fundamentals of Statistics, 5th. Pearson, [ISBN: 978-013450830].

Robert V. Hogg, Elliot Tanis and Dale Zimmerman. (2014), Probability and Statistical Inference, 9th. Pearson, [ISBN: 978-032192327].

Montgomery, D.C. & Runger G.C.. (2014), Applied Statistics and Probability for Engineers, [ISBN: 978-1-118-744].

Alan Agresti, Christine A. Franklin and Bernhard Klingenberg. (2016), Statistics: The Art and Science of Learning from Data, 4th. Pearson, [ISBN: 978-013386082].

This module does not have any article/paper resources

Other Resources

E-Book, James Miller, Jane Miller. (2010), Statistics and Chemometrics for Analytical Chemistry, http://library.aceondo.net/ebooks/Chemis try/0273730428.pdf

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SCHQA_8	Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance	-1	Mandatory
CR_SESST_8	Bachelor of Science (Honours) in Environmental Science and Sustainable Technology	-1	Mandatory
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Mandatory
CR_SCHEM_6	Higher Certificate in Science in Chemistry	-1	Mandatory