

APPROVED**STAT6014: Intro Stats for Phys. Sc.****Module Details**

Module Code:	STAT6014
Title:	Intro Stats for Phys. Sc. APPROVED
Long Title:	Intro Stats for Phys. Sc.
NFQ Level:	Fundamental
Valid From:	Semester 1 - 2019/20 (September 2019)
Duration:	1 Semester
Credits:	5
Field of Study:	4620 - Statistics
Module Delivered in:	7 programme(s)
Module Description:	This module provides an introduction to data analysis and probability theory. 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	Graphically display and numerically summarise data using methods of descriptive statistics.
LO2	Apply the rules of probability and use probability distributions to model random variables.
LO3	Model the relationship between two continuous variables using simple linear regression.
LO4	Use a statistical software package to perform exploratory data analysis and fit simple linear regression models.

Dependencies**Module Recommendations****Incompatible Modules**

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements

No requirements listed

Indicative Content**Descriptive Statistics**

Collection and presentation of data: frequency distributions, histograms, box plots, cumulative frequency, contingency tables. Calculation of summary statistics: measures of central tendency and measures of dispersion.

Probability

Classical, frequentist and axiomatic definitions. The elementary rules for calculation of probabilities. Independent events, mutually exclusive events, conditional probability, tree diagrams and Bayes' theorem.

Probability Distributions

Random variables. Discrete and continuous distributions. Properties of probability density and cumulative density functions. Expected value and variance. Binomial, Poisson, and Normal distributions. Use of statistical tables.

Regression and Correlation

Bivariate relationships, scatter diagrams, coefficient of correlation and coefficient of determination. Simple linear regression and transformation of variables to achieve linearity.

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
Assessment Description In-class test: descriptive statistics and probability.			
Assessment Type	Practical/Skills Evaluation	% of Total Mark	15
Timing	Week 12	Learning Outcomes	1,2,3,4
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	Analysis of simple case studies using statistical software	Every Week	1.00	1
Independent & Directed Learning (Non-contact)	Non Contact	Exercise sheets	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	Exercise Sheets	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

Currell, Graham; Dowman, Antony. (2009), Essential mathematics and statistics for science, Wiley-Blackwell, [ISBN: 0470694480].

Supplementary Book Resources

James McClave and Terry Sincich. (2018), A First Course in Statistics, 12. Pearson, [ISBN: 9781292165417].
 Allan G. Bluman. (2013), Elementary Statistics: A Step by Step Approach, 9. McGraw-Hill, [ISBN: 978-00735349].
 O'Shea, T. L.. (2013), Essential Statistics for Researchers, IT Tralee, [ISBN: 095750].
 Ross, Sheldon M. (2014), Introduction to probability and statistics for engineers and scientists, Elsevier, [ISBN: 0123948428].
 Neil J. Salkind. (2016), Statistics for People Who (Think They) Hate Statistics, 6. SAGE, [ISBN: 978-150633383].

This module does not have any article/paper resources

Other Resources

Website, CIT Department of Mathematics. MathsOnline, Accessible via CIT's Virtual Learning Environment, <https://mathematics.cit.ie/online>
 Website, WolframAlpha, <http://www.wolframalpha.com/>

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_SINEN_8	Bachelor of Science (Honours) in Instrument Engineering	-1	Mandatory
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Mandatory
CR_SPHYS_7	Bachelor of Science in Applied Physics and Instrumentation	-1	Mandatory
CR_SPHYS_6	Higher Certificate in Science in Applied Physics and Instrumentation	-1	Mandatory
CR_SCHEM_6	Higher Certificate in Science in Chemistry	-1	Mandatory