University of the West of Scotland

Module Descriptor

Session: 202425

Title of Module: Probability and Statistics			
Code: MATH08010	**SCQF Level: 8 (Scottish Credit and Qualifications Framework)**	**Credit Points: 20**	**ECTS: 10 (European Credit Transfer Scheme)**
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Dr Raymond Carragher		

Summary of Module

This module extends the ideas in basic statistics and probability from Analysis of Data (MATH07001) to a study of more advanced probability concepts including the Law of Total Probability and Bayes' Theorem. Having consolidated an understanding of the concept of probability, the emphasis will be on extending that understanding in a study of discrete and continuous random variables and probability distributions.

A range of commonly occurring discrete probability distributions will be discussed including binomial, Poisson, geometric and hypergeometric distributions. Additionally, a range of commonly occurring continuous probability distributions will be discussed including uniform, exponential, and normal distributions. The importance of the normal distribution will be discussed in detail, including reference to such topics as the central limit theorem.

The ideas of measuring average and variability in MATH07001 will be extended to the concepts of expectation and variance of a random variable. Moments of a random variable will be discussed.

The ideas of sampling distributions, confidence limits and intervals will be introduced. Suitable statistical software package(s) will be used for visual understanding of the concepts, calculations and predictions.

The Graduate Attributes relevant to this module are given below:

- Academic: Critical thinker; Analytical; Inquiring; Knowledgeable; Problem-solver; Digitally literate; Autonomous.
- Personal: Effective communicator; Motivated, Creative; Resilient/
- Professional: Collaborative; Research-minded; Socially responsible; Ambitious; Driven.

Module Delivery Method					
Face-To-Face	**Blended**	**Fully Online**	**HybridC**	**Hybrid 0**	**Work-Based Learning**

☒	☐	☐	☐	☐	☐
See Guidance Note for details.					

Campus(es) for Module Delivery						
The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
☒	☐	☐	☐	☐	☐	Add name

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	☒	Term 2	☐	Term 3	☐

Learning Outcomes: (maximum of 5 statements) **These should take cognisance of the SCQF level descriptors and be at the appropriate level for the module.** At the end of this module the student will be able to:	
L1	Implement suitable analytic procedures in problems involving discrete random variables and probability distributions.
L2	Implement suitable analytic procedures in problems involving continuous random variables and probability distributions.
L3	Demonstrate an understanding of sampling distributions, and use standard analytic techniques to estimate confidence limits/intervals.
L4	Use suitable software to perform statistical analysis and interpret its output.

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	SCQF Level **8** Demonstrating a knowledge and understanding of the concept of a probability distribution and resulting calculations.

Practice: Applied Knowledge and Understanding	SCQF Level **8** Using a range of standard techniques of calculation in solving standard problems in statistics and probability, and making valid interpretations of these.	
Generic Cognitive skills	SCQF Level **8** Using a range of methods to analyse well-defined problems in relevant mathematical or statistical contexts.	
Communication, ICT and Numeracy Skills	SCQF Level **8** Using suitable software to obtain and present results to statistical problems, as appropriate.	
Autonomy, Accountability and Working with others	SCQF Level **8** Working autonomously and with others to solve and produce short reports on statistical problems. Conceptualising and analysing problems informed by professional and research issues.	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: MATH07001	**Module Title:** Analysis of Data
	Other:	Or equivalent
Co-requisites	**Module Code:**	**Module Title:**

*Indicates that module descriptor is not published.

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Tutorial/Synchronous Support Activity	12

Laboratory/Practical Demonstration/Workshop	12
Independent Study	152
	200 Hours Total

****Indicative Resources: (eg. Core text, journals, internet access)**
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: Statistical software, e.g. Excel, SPSS, R. Generic software, e.g. Microsoft Word. “Probability and Statistics” class notes as published on the University VLE. "Introduction to Probability, Statistics and Random Processes", H Pishro-Nik
(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements
In line with the Student Attendance and Engagement Procedure: Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	Engineering and Physical Sciences
Assessment Results (Pass/Fail)	Yes ☐No ☒

School Assessment Board	Computing, Engineering and Physical Sciences
Moderator	Dr Kwok Chi Chim
External Examiner	P Wilson
Accreditation Details	
Changes/Version Number	1.07 Slight change to module summary. Change to assessment details and component title.

Assessment: (also refer to Assessment Outcomes Grids below)
Assessment 1 – A series of coursework assignments (50%)
Assessment 2 – Class Test (unseen, closed book) (50%)
(N.B. (i) **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Assessment Outcome Grids (See Guidance Note)

Component 1							
Assessment Type (Footnote B.)	**Learning Outcome (1)**	**Learning Outcome (2)**	**Learning Outcome (3)**	**Learning Outcome (4)**	**Learning Outcome (5)**	**Weighting (%) of Assessment Element**	**Timetabled Contact Hours**
Class Test (unseen, closed book)	✓	✓	✓			50	2

Component 2							
Assessment Type (Footnote B.)	**Learning Outcome (1)**	**Learning Outcome (2)**	**Learning Outcome (3)**	**Learning Outcome (4)**	**Learning Outcome (5)**	**Weighting (%) of Assessment Element**	**Timetabled Contact Hours**
Coursework				✓		50	5

Combined Total for All Components	**100%**	**7 hours**