MODULE SPECIFICATION

Part 1: Information			
Module Title	Stochastic Processes		
Module Code	UFMFLH-15-M	Level	Level 7
For implementation from	2018-19		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Computer Sci & Creative Tech		
Contributes towards			
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: This module is designed to develop the student's knowledge and understanding of stochastic processes, including the mathematical foundations, computational aspects and applications. In particular, the underlying probability theory will be discussed, as will the properties of important examples and classes of stochastic processes. A selection of stochastic process models in areas such as science, engineering, social science or finance will be studied. In addition, students will apply computational techniques, such simulation, to gain understanding of the behaviour of stochastic processes, including models of real world situations. Both discrete and continuous time processes will feature in the module.

Outline Syllabus: The following syllabus is indicative:

Probability Theory:

Probability spaces, random variables and distributions; independence; conditional expectation; convergence of random variables.

Stochastic Processes:

Stochastic processes (definitions and fundamental ideas); introduction to stochastic calculus and stochastic differential equations; examples and classes of stochastic processes, both discrete time and continuous time (e.g., Markov chains, martingales, Poisson, Brownian motion, geometric Brownian motion); models (taken from a range of real-world applications, for example queuing).

Computational Aspects:

Simulation of distributions and of processes; analysis of time series data.

Teaching and Learning Methods: The module syllabus will be delivered by means of lectures, which will introduce and develop new material and provide context. Problems classes/workshops will be used to go through solutions to homework exercises or to consolidate/contextualise material. Tutorials will offer mathematical support, guidance and feedback. Students will have the opportunity to ask individual questions about problems they may be having with homework exercises, lecture material, assessment preparation, etc. Scheduled contact will also include some computer laboratory sessions.

Part 3: Assessment

The assessment will consist of a single three hour examination that features a combination of partially seen and unseen questions. The unseen questions will assess primarily the first two learning outcomes, whilst the partially seen questions will assess primarily the third and fourth learning outcomes.

The problem classes and workshops are designed to provide regular feedback and together with the partially seen questions, encourage an active engagement and deeper understanding of the module material. The assessment method (wholly by examination) will prevent plagiarism and is aligned with the programme's assessment strategy to enable students to manage coursework workloads effectively.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	100 %	Examination (3 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination - Component A	✓	100 %	Examination (3 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	To demonstrate an understanding of the mathematical foundations of stochastic processes
MO2	To demonstrate knowledge of the definition and properties of some important examples and classes of stochastic processes
MO3	To apply, in a critical fashion, appropriate mathematical techniques to analyse stochastic process models in areas such as science, engineering, social science and finance
MO4	To demonstrate how computational techniques, such as simulation, may be employed to gain understanding of the behaviour of stochastic processes, including models of real world situations

Contact Hours

Contact Hours	
Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Face-to-face learning	36
Total Scheduled Learning and Teaching Hours:	36
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html