STUDENT AND ACADEMIC SERVICES

UWE Bristol | University of the West of England

MODULE SPECIFICATION

Part 1: Information			
Module Title	Systems Modelling [TSI]		
Module Code	UFCFBX-12-2	Level	Level 5
For implementation from	2022-23		
UWE Credit Rating	12	ECTS Credit Rating	6
Faculty	Faculty of Environment & Technology	Field	Computer Science and Creative Technologies
Department	FET Dept of Computer Sci & Creative Tech		
Module Type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co-requisites	None		
Module Entry Requirements	None		
PSRB Requirements	None		

Part 2: Description
Educational Aims: The aim of this module to acquaint the students with stages of the modelling life cycle with the accent on simulation (stochastic) modelling, to construct simulation models using the simulation software and fulfilling of experiments on the computer. The module adopts the use of modern simulation software such as AnyLogic and ExtendSim to complete the practical assignment'. The module provides a strong practical element giving ample opportunity to learn and practise new skills. **Outline Syllabus:** Main concepts of modelling. Review of tasks in Computer Science which decided by modelling; Classification of models. Analytical models review; Concepts of simulation modelling. Cycle of simulation modelling; Discrete event approach in simulation; Random number generators; Generating random event, processes and vectors; Simulation software review; Simulation model development tools; Use modern simulation software such as AnyLogic/ExtendSim for model development'; Verification and validation of model;

Experiment design;
Analysis of the simulation results & decision making;
System dynamic and agent-based approach to simulation;
Simulation of transport and business process;
Cases

Teaching and Learning Methods: Learning and teaching will be provided to students in two forms: lectures and practical classes. During lectures, theoretical aspects of the course will be provided to students by the teaching staff. Lectures will be supported by presentation published and available to the students on e.tsi.lv under the module section. Also, additional materials, like publications on the internet, videos etc will be presented in TSI LMS.
During practical classes, each student receives an individual task to perform

Modern simulation software such as AnyLogic or ExtendSim will be used in practical classes (students' choice).
 In addition to learning activities during taught sessions, students are expected to spend time outside of class on independent learning activities. These might include completing assignment tasks, independent reading, practising new skills on personal projects and watching informative videos, completing self-assessment test etc

Part 3: Assessment

This module assessment is split into two components (A – Exam, B – Practical Assignments):

A1 - Final 3-hour examination which will assess the students understanding of taught material that forms part of the learning outcomes but cannot easily be assessed through practical tasks.

B1 – A sequence of laboratory works, completed by each student individually. The output of each laboratory work is a report (max 10 A4 pages) provided to teaching staff using TSI LMS. Each laboratory work covers set of practical topics, like simulation model implementation using any programming language and development and testing of random number generators; the implementation of a simple model developed with simulation software such as AnyLogic or ExtendedSim; the implementation of advanced model developed with simulation software such as AnyLogic or ExtendedSim; implementation of advanced model with animation development, with performing validation and experimentation using simulation software such as AnyLogic or ExtendedSim.

First Sit Components	Final Assessment	Element weighting	Description
Portfolio - Component B		40 %	A portfolio of Laboratory work completed by students (each lab should be accompanied with a report).
Examination - Component A		60 %	Written Examination
Resit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		40 %	A portfolio of Laboratory work completed by students (each lab should be accompanied with a report).
Examination - Component A		60 %	Written Examination

Part 4: Teaching and Learning Methods

Learning Outcomes	On successful completion of this module students will achieve the following learning outcomes:	
	Module Learning Outcomes	**Reference**
	Apply principles of simulation and modelling of complex systems	MO1
	Apply principles of development of simulation models of various types	MO2
	Apply principles of the software implementation of stochastic systems and requirements for the implementation of algorithms of random number generators	MO3
	Apply principles of modern simulation software creation	MO4
	Analysis and design of discrete-event simulation algorithms	MO5
	Conduct experiments with the model, process and analyse the results	MO6
	To develop valid simulation models applying modern simulation software	MO7
	To perform scenario analysis based on MoE	MO8
	To interpret simulation results	MO9
	To tune simulation models	MO10

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	48
	Total Independent Study Hours:	48
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	32
	Total Scheduled Learning and Teaching Hours:	32
	Hours to be allocated	120
	Allocated Hours	80

Reading List	*The reading list for this module can be accessed via the following link:* https://rl.talis.com/3/uwe/lists/6DA16209-FFCB-D027-E551-31C6C37AC2C9.html?lang=en-gb&login=1

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Computer Science and Software Development [Oct][FT][TSI][4yrs] BSc (Hons) 2020-21

Computer Science and Software Development [Feb][FT][TSI][4yrs] BSc (Hons) 2020-21