Module Specification

Systems Modelling   [TSI]

Version: 2023-24, v3.0, 17 Mar 2023

Contents

Part 1: Information

Module title: Systems Modelling   [TSI]

Module code: UFCFBX-12-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 12

ECTS credit rating: 6

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: Transport and Telecommunication Institute

Delivery locations: Not in use for Modules

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

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

Part 3: Teaching and learning methods

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

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply principles of simulation and modelling of complex systems

MO2 Apply principles of development of simulation models of various types

MO3 Apply principles of the software implementation of stochastic systems and requirements for the implementation of algorithms of random number generators

MO4 Apply principles of modern simulation software creation

MO5 Analysis and design of discrete-event simulation algorithms

MO6 Conduct experiments with the model, process and analyse the results

MO7 To develop valid simulation models applying modern simulation software

MO8 To perform scenario analysis based on MoE

MO9 To interpret simulation results

MO10 To tune simulation models

Hours to be allocated: 120

Contact hours:

Independent study/self-guided study = 48 hours

Face-to-face learning = 32 hours

Total = 80

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

Part 4: Assessment

Assessment strategy: This module assessment is split into two:

A 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.

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.

Assessment components:

Portfolio (First Sit)
Description: A portfolio of Laboratory work completed by students (each lab should be accompanied with a report).
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO10, MO2, MO4, MO6, MO7, MO8, MO9

Examination (First Sit)
Description: Written Examination
Weighting: 60 %
Final assessment: Yes
Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Portfolio (Resit)

Description: A portfolio of Laboratory work completed by students (each lab should be accompanied with a report).

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO10, MO2, MO4, MO6, MO7, MO8, MO9

Examination (Resit)

Description: Written Examination

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science and Software Development {Double Degree} [Feb][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Oct][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Oct][PT][TSI][5yrs] BSc (Hons) 2020-21

Computer Science and Software Development {Double Degree} [Feb][PT][TSI][5yrs] BSc (Hons) 2020-21