



Module Specification

Robotics Research Training Workshops

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Part 1: Information

Module title: Robotics Research Training Workshops

Module code: UFMF8Y-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field:

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: This module complements the research development 'soft skills' covered in the University of Bristol led Robotics Research Preparation unit.

Features: Not applicable

Educational aims: The Robotics Research Training module provides the students with hands-on introductory training on skills needed for research in robotics. The

knowledge is delivered in a hands-on style through half-day and day workshops by academics and guest speakers from industry.

Outline syllabus: The topics that will be covered in the workshops are of a wide range. They have been chosen to cover many different needed skills that are needed by a successful robotics researcher. Example for the topics that will be covered are as follows:

Fundamental mathematical methods for solving robotics problems.

Introduction to Robot Operating System (ROS).

Programming robots in C++ and Python.

Introduction to project management and managing your own research.

Usage of computer-aided design and rapid prototyping techniques to manufacture robot components.

Principles of responsible innovation and their importance in robotics and autonomous systems.

Introduction to electronics components for robotics.

Part 3: Teaching and learning methods

Teaching and learning methods: The module will make use of existing facilities provided at the Bristol Robotics Laboratory and guest lectures provided by industry partners. The module will be delivered by the CDT Management team, the CDT technician and guest lecturers. Specialist facilities at BRL will be employed including rapid prototyping and small-group Linux computer teaching room.

The module will be structured in 12 x 1-day training sessions organised as workshops on relevant topics (72 hours). Reading and self-study preparatory assignments (e.g. online programming tutorials or homework problem sheets) will be set in advance, totalling approx. 4 hours per workshop (48 hours). Online reflective account assignment sized to require 12 hours total.

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

MO1 Solve robotics problems using mathematical models, e.g. design and interpretation of experiments using statistics and analysis of kinematics and reference frames using linear algebra

MO2 Solve computer programming challenges using appropriate tools, including the Robotics Operating System (ROS) and good structure and style in Python or C++

MO3 Manufacture simple robot components by applying computer-aided design and rapid prototyping techniques

MO4 Appraise principles of Responsible Innovation (RI) on given examples from robotics research by using the ethics frameworks as for example the AREA framework

MO5 Critically discuss the importance of Responsible Innovation Robotics and Autonomous Systems and apply RI methods to their own research

MO6 Effectively apply project management approaches to plan their own research projects

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 48 hours

Face-to-face learning = 72 hours

Total = 120

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://ri.talis.com/3/uwe/lists/03E4CF79-1C3E-592D-335C-1A97BD15F28E.html) via the following link <https://ri.talis.com/3/uwe/lists/03E4CF79-1C3E-592D-335C-1A97BD15F28E.html>

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

The participation in the workshops and will be assessed by in-workshop exercises.

The students will be asked to individually present the workshop results of at least 9 of the 12 workshops in a portfolio.

Individual reflective accounts of the training experience, including a critical review of the tools encountered and frameworks introduced, assessed through a structured set of online questions demanding text responses. Students have to answer at least 9 of the 12 workshop questionnaires.

Resit is the same as the first sit

Assessment tasks:

Portfolio (First Sit)

Description: A portfolio of workshop exercises.

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

In-class test (First Sit)

Description: Questionnaires

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4, MO5, MO6

Portfolio (Resit)

Description: A portfolio of workshop exercises.

Weighting: 75 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

In-class test (Resit)

Description: Questionnaires

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4, MO5, MO6

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Robotics and Autonomous Systems {Joint Award}[Frenchay] PhD 2023-24