# MODULE SPECIFICATION

| Part 1: Information | | | |
|---|---|---|---|
| Module Title | Robotics Research Training Workshops | | |
| Module Code | UFMF8Y-15-M | Level | Level 7 |
| For implementation from | 2020-21 | | |
| UWE Credit Rating | 15 | ECTS Credit Rating | 7.5 |
| Faculty | Faculty of Environment & Technology | Field | |
| Department | FET Dept of Engin Design & Mathematics | | |
| Module Type: | Standard | | |
| Pre-requisites | None | | |
| Excluded Combinations | None | | |
| Co-requisites | None | | |
| Module Entry Requirements | None | | |
| PSRB 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

**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.

**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.

**Part 3: Assessment**

The module will be assessed in two components.

Component A will assess 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.

Component B will require 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 Strategy

Component A will require the submission of an individually prepared report containing a critical discussion of 9 of the workshop topics.
Component B will require students to answer at least 9 of the 12 online workshop questionnaires.

| First Sit Components | **Final Assessment** | **Element weighting** | **Description** |
|---|---|---|---|
| Portfolio - Component A | ✓ | 75 % | A portfolio of workshop exercises. |
| In-class test - Component B | | 25 % | Questionnaires |
| **Resit Components** | **Final Assessment** | **Element weighting** | **Description** |
| Report - Component A | | 75 % | Report (up to 3000 words). |
| In-class test - Component B | | 25 % | Questionnaires |

**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** |
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| 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 | MO1 |
| Solve computer programming challenges using appropriate tools, including the Robotics Operating System (ROS) and good structure and style in Python or C++ | MO2 |

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|---|---|---|
| | Manufacture simple robot components by applying computer-aided design and rapid prototyping techniques | MO3 |
| | Appraise principles of Responsible Innovation (RI) on given examples from robotics research by using the ethics frameworks as for example the AREA framework | MO4 |
| | Critically discuss the importance of Responsible Innovation Robotics and Autonomous Systems and apply RI methods to their own research | MO5 |
| | Effectively apply project management approaches to plan their own research projects | MO6 |

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| 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 | 72 |
| | **Total Scheduled Learning and Teaching Hours:** | 72 |
| | **Hours to be allocated** | 150 |
| | **Allocated Hours** | 120 |
| Reading List | *The reading list for this module can be accessed via the following link:*<br><br>https://rl.talis.com/3/uwe/lists/03E4CF79-1C3E-592D-335C-1A97BD15F28E.html | |

| **Part 5: Contributes Towards** |
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| This module contributes towards the following programmes of study: |