# Module Specification

## Human Robot Interaction Technologies

Version: 2025-26, v3.0, Approved

**Contents**

**Module Specification** ..... **1**

**Part 1: Information** ..... **2**

**Part 2: Description** ..... **2**

**Part 3: Teaching and learning methods** ..... **4**

**Part 4: Assessment** ..... **5**

**Part 5: Contributes towards** ..... **6**

## Part 1: Information

**Module title:** Human Robot Interaction Technologies

**Module code:** UFMFUT-15-3

**Level:** Level 6

**For implementation from:** 2025-26

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**College:** College of Arts, Technology and Environment

**School:** CATE School of Engineering

**Partner institutions:** None

**Field:** Engineering, Design and Mathematics

**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:** Robots are already used and will be more and more used in new application areas in which untrained humans have to collaborate and successfully use these robots. Therefore, it is important to study and understand what the fundamental building blocks are that are needed to enable a robot to interact with a human, and how to implement these technologies.

This module will cover the basic technology needed for a robot to process and

understand human intentions, to track its environment for spatial reasoning, to make decisions based on the input, and to generate responses to the human. The module will also give an introduction to architectures for HRI systems. Additionally, the module will cover a general overview of user-centred design concepts and usability engineering methods that are helpful to develop robots that are tailored to the needs of an end user.

**Features:** Not applicable

**Educational aims:** This module will provide an overview of the technical components and embedded cognitive AI that are needed for a human-robot interaction (HRI) system. It will also teach about user-centred design methods used to analyse end user requirements, involve end users in robot development, and do user-based robot testing.

**Outline syllabus:** Syllabus outline
Robot Input Modalities

Speech recognition
Person tracking
Face recognition
Posture recognition
Object recognition

Decision Making and Reasoning

Finite state systems
Logical reasoning
Probability-based reasoning
HRI system architectures and inter-module communication

Robot Output Modalities

Robot appearance
Speech synthesis
Legible robot motions

User-Centred Design

Introduction and general concepts
Usability testing

## Part 3: Teaching and learning methods

**Teaching and learning methods:** Sessions will include lectures leading to group work in practical sessions. In the practical session, students will work together in groups to design and implement a HRI system on a real robot. This will include the implementation of basic input and output modalities, a decision making component, and the communication architecture for all modules. The practical part will also include preparing and running a usability test with the implemented system.

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

**MO1** Describe and critically analyse the constituent parts of a HRI system architecture.

**MO2** Apply concepts from user-centred design and usability testing to a given human-robot interaction use case

**MO3** Implement a complete HRI system with input and output modalities as well as a decision making component

**MO4** Execute a usability test with users who have not used the implemented HRI system before

**MO5** Report and critically discuss the results of a usability test with an HRI system

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 12 hours

**Reading list:** The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/index.html

## Part 4: Assessment

**Assessment strategy:** The module will be assessed as follows:

An exam where students are required to demonstrate detailed technical understanding of the technical properties of HRI systems. This examination will consist of short descriptive textual questions as well as problems, calculations and data interpretation questions, for the students to show that they have a technical understanding of the design and operation of HRI systems in different usage contexts.

A group presentation in which student groups present the technical details of the HRI system they have implemented in the practical sessions.

Resit:
Resit assessment will be the same as the first sit.

Resit deliverable(s) will be scaled appropriately to group size and task complexity

**Assessment tasks:**

**Report** (First Sit)
Description: A report of a design exercise (3000 words)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3, MO4, MO5

**Examination (Online)** (First Sit)
Description: Written examination (2 hours + 2 hours submission window)

Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

**Report** (Resit)
Description: A report of a design exercise (3000 words)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3, MO4, MO5

**Examination (Online)** (Resit)
Description: Written examination (2 hours + 2 hours submission window)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Robotics [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation} [Frenchay] BEng (Hons) 2022-23

Robotics [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation}[Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Robotics [Frenchay] BEng (Hons) 2022-23

Robotics {Foundation} [Frenchay] BEng (Hons) 2022-23