# Module Specification

## Human Robot Interaction Technologies

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## Part 1: Information

**Module title:** Human Robot Interaction Technologies

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

**Level:** Level 6

**For implementation from:** 2027-28

**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:** This module covers 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 introduce 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** Design and implement the components of an HRI system architecture, including input/output modalities, decision-making components, communication networks, and a functional HRI system.

**MO2** Apply user-centred design principles, conduct usability tests on HRI systems, and effectively report the results of these evaluations.

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

**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/0D82515B-7073-C2B3-D59E-E4C193B72B3C.html

## Part 4: Assessment

**Assessment strategy:** The assessment strategy for the Human-Robot Interaction Technologies (HRIT) course uses a summative approach, evaluating students through a structured portfolio. This includes a technical report and a live presentation showcasing the NAO robot's speech recognition, person tracking, decision-making, and interaction capabilities. Collectively this allows students to develop and reflect on

the LOs from various perspectives. A demonstration ensures practical application and problem-solving skills.

**Assessment tasks:**

**Portfolio** (First Sit)
Description: The report should be up to 2000 words and cover the Human-Robot Interaction Technologies module portfolio, which documents the group's technical project using a commercial robot to address a real-world problem. Presentations should last approximately 10 minutes to describe the system, purpose, and interaction plan.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

**Portfolio** (Resit)
Description: Resit deliverable(s) will be scaled appropriately to group size and task complexity. The report should be up to 2000 words and cover the Human-Robot Interaction Technologies module portfolio, which documents the group's technical project using a software-simulated robot on the computer to address a real-world problem. Presentations should last approximately 10 minutes to describe the system, purpose, and interaction plan.
Weighting: 100 %
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 {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation} [Frenchay] BEng (Hons) 2024-25

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation} [Frenchay] BEng (Hons) 2024-25

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics {Foundation} [Frenchay] BEng (Hons) 2024-25

Robotics [Frenchay] BEng (Hons) 2025-26

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics [Frenchay] BEng (Hons) 2025-26

Robotics {Foundation} [Frenchay] BEng (Hons) 2024-25