STUDENT AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Information			
Module Title	Human-Robot Interaction		
Module Code	UFMFHP-15-M	Level	Level 7
For implementation from	2019-20		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
Overview: This module will provide an overview of human-robot interaction (HRI) as a research field. It will cover different contexts in which humans interact with robots now and in the future and how these contexts shape the physical and social constraints of the interaction. For example, we will look at the assisted living context, in which robots support humans in their homes and thus have to display socially appropriate behaviours. In contrast to that, we will look at collaborative robots in industrial settings, in which knowledge about task planning and part assembly is more important. The module also introduces the technologies needed in a HRI system, for example vision processing, speech recognition and natural language understanding, reasoning, output generation, and cognitive robot architectures. We will introduce the human factors that are relevant for a successful HRI (e.g., acceptance, trust, cognitive load) and how to measure these factors. Finally, the module describes how to set up, execute, and analyse HRI user studies.

Educational Aims: See learning outcomes.

Outline Syllabus: Definitions:

Human, robot, interaction

Properties of HRI systems

Multimodal interaction

Levels of autonomy

Technology: Parts of a human-robot interaction system:

Input processing

Speech recognition, natural language processing, dialogue management

Emotion recognition

Attention Tracking Reasoning, task planning

Multimodal output generation

Cognitive architectures for human-robot interaction

HRI user studies:

Study setup

Study execution

Study analysis (includes short intro into statistics)

Latest HRI research:

Social robotics

Machine learning and HRI

Contextual framing of HRI

Overview of latest work from HRI conferences and journals

Teaching and Learning Methods: Sessions will include lectures leading to group work in practical sessions. During the module students will prepare and execute a small HRI user study with a real robot (Nao or Pepper). The lectures are designed to cover the major areas of HRI and should be a starting point for further reading and study, and for the practical sessions. In the practical sessions, HRI software tools will be used to learn how to perceive and react to humans interacting with the robot. You will also learn to use statistical software to analyse your datasets.

Part 3: Assessment

The module will be assessed in two components. Component A is an exam where students are required to demonstrate detailed technical understanding of the design and properties of HRI systems, Component B is an individual report in the format of a scientific research paper. The assignment task is organised with students working as a member of a team on a research project and then submitting an individual report based on that group research activity.

Component A

A1. An exam of two hours duration. 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.

Component B

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B1. An individual report of not more than 3000 words based upon practical work and the user study carried on during the group research project. The report will be structured as a scientific research paper.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component B		60 %	Individual report (3000 words)
Examination - Component A	✓	40 %	Exam (2 hours)
Resit Components	Final Assessment	Element weighting	Description
Report - Component B		60 %	Individual report (3000 words)
Examination - Component A	✓	40 %	Exam (2 hours)

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
Identify and describe the interplay of the parts of a HRI system architecture, including input, reasoning, and output components	MO1
Demonstrate understanding of the challenges that arise when building a system for multimodal interaction, such as an HRI system	MO2
Analyse a given context for an HRI system and make necessary changes to the system design for the context	MO3
Design and construct an HRI system with rudimentary input processing, reasoning, and output processing	MO4
Design and execute a HRI user study	MO5
Analyse, critically discuss, and scientifically report the results of a HRI user study	MO6

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	114
	Total Independent Study Hours:	114
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	36
	Total Scheduled Learning and Teaching Hours:	36
	Hours to be allocated	150

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	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ufmfhp-15-m.html	

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