



Module Specification

Robotic System Architectures

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Part 1: Information

Module title: Robotic System Architectures

Module code: UFMFWT-15-3

Level: Level 6

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: 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 introduces students to technical aspects of architectures for robotic systems, including system/software engineering principles to develop robots endowed with sophisticated capabilities, e.g., autonomous navigation. The focus of the module is on the system/software engineering and programming tools that can support the often-complex concepts of robotic system architectures.

Features: Not applicable

Educational aims: This will equip students with the theoretical and practical techniques used for the development of robotic systems that are based on widely used conventional architectures, modelling standards, and programming languages.

Outline syllabus: Architecture and development of complex, robotic systems studying the following technical aspects:

Robot Architectures

Robot anatomy, nature of robotic systems, complexity management, robotic system representation, architectural inspirations, types of robot architectures

Development Lifecycle

Requirements analysis, robotic system design, modelling standards, realization of robot architecture, robotic system verification/validation, acceptance and certification

Robotics Software

Software integration, operating systems, middleware, development tools, Robot Operating System (ROS), Python

Part 3: Teaching and learning methods

Teaching and learning methods: A combination of lectures, demonstrations and laboratory sessions ensure that students are able to apply programming concepts within a robotics environment applied to real engineering problems.

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

MO1 Identify and evaluate relevant theories and techniques in order to develop control software for robotics applications. [SM1b] {SM1m}

MO2 Apply appropriate theoretical and practical methods to analyse a variety of architectural approaches to solve robotics problems. [EA1b, EA4b] {EA1m, EA3b}

MO3 Use programming languages and conventional middleware to optimise solutions for design problems of robot control software. [D4] {D4m}

MO4 Manage resources and identify and critically review technical literature for research and project process. [P4] {EP4m}

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 12 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://rl.talis.com/3/uwe/lists/EFF0F12B-1965-20C3-3007-BC637C2773ED.html) via the following link <https://rl.talis.com/3/uwe/lists/EFF0F12B-1965-20C3-3007-BC637C2773ED.html>

Part 4: Assessment

Assessment strategy: Task A: Progress Presentation

A group presentation with questions. It is an assessment of learning and feedback towards the submission of the report (feedforward) will be provided.

Task B: Coursework Report

A group report of not more than 3000 words based upon the coursework in robotic system architectures.

Resit is the same as the first sit

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

Assessment tasks:

Presentation (First Sit)

Description: Group presentation with questions

Weighting: 30 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2

Report (First Sit)

Description: Group written report (3000 words)

Weighting: 70 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation (Resit)

Description: Group presentation with questions

Weighting: 30 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2

Report (Resit)

Description: Group written report (3000 words)

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

Weighting: 70 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Robotics [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Robotics {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21

Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21