2A FISE	CU 7.3
Semester 7	6 School ECTS

CU 7.3: INNOVATION & RETRO-ENGINEERING (Robotics)

Director of studies: Anis BOUALI

General CU objectives:

– Describe, and analyse the operation of a robot
– Study the mechanical and electrical elements of robots
– Perform simulations
– Create robot programs for simple application
– Launch, monitor and supervise a robotic production
– Organise production
– Prepare instruction documents
– Manage a project from the idea to the industrial prototype.
– Prepare for the industrialisation of new products.

Consists of:

- Module 1: Introduction to robotics
- Module 2: Industrialisation
- Module 3: Not applicable
- Module 4: Not applicable

Hourly volume

In-person		*Self-directed study*
10.50 H	**Lectures**	**60.00 H**
10.00 H	**Tutorials**	
56.00 H	**Practicals**	

Positioning of the CU in the School reference system:

Units of skills
In accordance with the RNCP sheet

Updated on 25 April 2025

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Module 1: Introduction to robotics	Coefficient 1
Session leaders: Anis BOUALI, Guillaume DEMESURE, Marc JAFFRES	
Teaching assistants: Julien LALLEMAND	
Prerequisites: CU 5.2, CU 5.5 and CU 6.5	
Teaching materials: Course notes – Presentation slides – Reading list – Reference book – Files	
Assessment methods: individual and in groups In-class exam– File	

Learning outcomes	Description	Number of student hours (in-person)		
		Lectures	Tutorials	Practicals
At the end of this course, the student must be able to describe, model, analyse and control a handling robot. At the end of this module, students will be able to: – Program a robot according to the different modes: online and offline. – Choose suitable trajectories in relation to a given application – Manage the notions of collision and singularity – Choose a grip mode adapted to an application	Introduction to robotics: Definitions, news in robotics, robots and industry, robot typologies. Robotics / electrical technology: actuators and sensors for robotics (to extend beyond the commercial positioning) – Read, understand and interpret technical documentation for a robot. Modelling of a handling robot Understand and use the description conventions and modelling of a robot. Geometric, kinematic and dynamic description.	8.75	10.00	8.00
	Through several robotic cells, students will have to program a robot to carry out a certain number of tasks in accordance with precise specifications imposing a: – Working environment (conveyor belt, pallet, various machines, etc.) – Grip mode or modes – Rate objective (optimisation of cycle times)			8.00
At the end of this module, students will be able to: – Program a robot. – Choose suitable trajectories in relation to a given application. – Manage the notions of collision and singularity.	Through robotic cells, students will have to program a robot to carry out a certain number of tasks in accordance with specifications imposing a work environment (storage, machines, machining, etc.).	1.75		12.00

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10.50	**10.00**	**28.00**

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Module 2: Industrialisation	**Coefficient 1**
Session leaders: Pierre-Jean MÉAUSOONE, Marc JAFFRES, Alain RENAUD	
Teaching assistants:	
Prerequisites: CU 9.0999999999999996. CU 5.1. CU 5.5. 6.5	
Teaching materials: Course notes – Presentation slides – Reading list - Project	
Assessment methods: individual and in groups Report - Practical examination	

Learning outcomes	**Description**	**Number of student hours (in-person)**		
		Lectures	**Tutorials**	**Practicals**
Carry out production tasks: – Prepare materials and resources necessary for production. – Communicate information to production. – Organise production. – Validate the process technically and economically. – Improve and manage production quality.	The project consists of making a product or a construction or part of a construction in a group. To do this, the apprentice will have to prepare and configure: – Means of production – Production tools (machining, assembly, finishing, etc.) – The means of control. They need to manufacture all or part of the elements of the assembly to be produced. They need to ensure the control and possibly the installation.			28.00
		0.00	**0.00**	**28.00**

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