

<b>Unit A Spain</b>	<b>Title of the unit: Working with FMS (Flexible Manufacturing System) systems</b>		
<b>Prerequisites:</b>	<ul style="list-style-type: none"> <li>- Basic pneumatic systems</li> <li>- Basic knowledge of electricity</li> <li>- Basic knowledge about most common sensors (optical, inductive, capacitive, mechanical)</li> </ul>		
<b>Work tasks:</b>	<ul style="list-style-type: none"> <li>- Assembly, programming and commissioning of a production module including SFC (Sequence Function Chart) programming with PLC.</li> <li>- Assembly, programming and commissioning of several production modules into a production line using I/O communication between modules.</li> <li>- Fault finding in a PLC-controlled production modules in order to replace broken components.</li> <li>- Using production stops in a production module programmed by SFC.</li> <li>- Applying general safety rules and writing a test report.</li> </ul>		
<b>Learning Outcomes:</b>	<i>Knowledge</i>	<i>Skills</i>	<i>Competence</i>
	<ul style="list-style-type: none"> <li>- He/she knows how to define the basic processes using SFC (Sequential Function Chart) methods.</li> <li>- He/she knows how to recognise syntax of SFC-language according to IEC 61131-3.</li> <li>- He/she knows how to describe how to program the production modules.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is able to analyse the process that has to be controlled.</li> <li>- He/she is able to run through a PLC program, using a given SFC, and check if it works properly.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is responsible for applying IEC 61131-3 to create a PLC-program using SFC.</li> </ul>
	<ul style="list-style-type: none"> <li>- He/she knows how to recognise electro technical symbols and knows in which norm to find them.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is able to test the output condition and actuators</li> <li>- He/she is able to test the input condition and sensors.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is responsible for the correct functioning of the installation using the module's diagrams.</li> </ul>
	<ul style="list-style-type: none"> <li>- He/she knows how to recognise if a machine is working in proper conditions.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is able to decide if a component is broken or working properly.</li> <li>- He/she is able to use the program to monitor the process for fault finding.</li> <li>- He/she is able to check and measure the circuit using a wiring diagram.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is responsible for applying the right strategy to fix identified faults.</li> </ul>
	<ul style="list-style-type: none"> <li>- He/she knows how to describe the rules for writing a test report.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is able to evaluate the function of the different parts of the installation.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is responsible for reflecting upon his/her actions in a test report.</li> </ul>
	<ul style="list-style-type: none"> <li>- He/she knows how to describe the general safety rules.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is able to point out when a machine doesn't meet with certain safety standards</li> <li>- He/she is able to work in proper conditions, trying to avoid any kind of risk.</li> </ul>	<ul style="list-style-type: none"> <li>- He/she is responsible for applying general and specific branch related safety rules and procedures in his/her work.</li> </ul>

				so that electro technical products and systems will be tested properly.
<b>Reference to national qualification:</b>	<b>The Netherlands</b>	<b>Sweden</b>	<b>Finland</b>	<b>Spain</b>
	Middenkader Engineering Technicus (crebo 94421)	El och Energiprogrammet, inriktning Automation Industri tekniska programmet, inriktning Drift och underhållsteknik Teknikprogrammet, inriktning Produktionsteknik	Grundexamen inom el- och automationsteknik Grundexamen inom maskin- och metallbranschen	Automatización y robótica Industrial Técnico Superior en Mecatrónica Industrial Técnico superior en Mantenimiento de Equipo Industrial
<b>Reference to NQF:</b>	Level 4	N/A	N/A	5
<b>Reference to EQF:</b>	Level 4*	Level 4*	Level 4*	Level 5*
<b>ECVET points</b>	N/A**			
<b>Assessment:</b>	Observations			

\* The unit has been identified as part of the above mentioned national vocational qualifications and has by that been referenced to the same EQF level as the qualification.

\*\* Further experimentation of the concept of ECVET points is required at European level before utilisation in practice.

Assessment Grid		
Name Student:		
Name Assessor:		
Location of Assessment:		
Date of Assessment:		
Time of Assessment:		
Unit Assessed:	<b>Working with FMS (Flexible Manufacturing System) systems</b>	
Level that the student is being assessed on is 'under surveillance'.		
	yes	no
1a		
The student shows an analysis of the work process on paper.		
The student makes an input output list (on the computer).		
The student chooses the right sequence combination series parallel.		
The student shows a working program.		
2		
The student explains the electrical drawing with inputs and outputs.		
The student explains the mechanical drawing with inputs and outputs.		
The student explains what the action of the actuator is when the output is high.		
3		
The student uses the monitor function of the PLC program.		
The student explains if the sequence stops, why it stops.		
The student explains how to identify a broken component.		
The student is able to measure the sensor/actuator to determine if it is really broken.		
The student is able to measure the connection between the PLC and sensor/actuator to determine if it is really broken.		

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4		
The student makes notes of his measurements.		
5		
The student puts off the energy while working on the machine.		
The student works according to the safety rules according the workplace.		
6		
The student co-operates with colleagues.		