RoboVET
VET Programme in Robotics Technician

Diagnostic of the training needs for a level 4 VET graduation on Robotics Technician

(Executive Summary and Course Structure)

Executive Summary

Most EU-28 countries do not have a VET graduation on Robotics Technician, although it is demanded by a highly technological and competitive job market. Despite the acknowledgement of its importance, the training institutions demonstrate difficulties to adjust to the quick pace of transformation of the labour market. There are indeed disperse training units, but in most EU-28 countries, there is not a full VET training programme to produce qualified Robotics Technicians.

The creation of the joint VET qualification in Robotics will match the market needs of complex and transferable skills by supplying trainees with interdisciplinary profiles and the right skills to enable competitiveness and innovation. This will contribute to increase the employability of young people highly skilled and qualified. The industry 4.0 workforce is expected to have high mobility within Europe, thus it is important to produce a curricula harmonised among different European countries, with high transferability to all EU-28.

The RoboVET project arose as a solution to match the market needs to the qualifications primarily in Portugal, Spain and Cyprus. To accomplish that, the design of the project defined a set of activities that will lead to the achievement of the established milestones.

This report presents the methodology followed to collect information for the diagnostic of the training needs for a level 4 VET graduation on Robotics Technician, namely the implementation of questionnaires, interviews and the analysis of the VET curricula on areas related to Robotics.

The relevant data collected from the mentioned activities and the discussions that arose from the implementation of three round tables allowed the identification of the significant areas of knowledge that should be included in the Robotics Technician course. It also enabled reaching specific and transversal contents that should be part of the course structure.

The Robotics Technician VET programme is structured in mandatory and optional contents, which allow the fulfilment of local, economic and structural demands. Schools and educational centres will be able to choose the most suitable training units according to the type of industrial sectors present in the geographical area of the schools with this VET offer, and according to the identified regional needs. It corresponds to level 4 of the European Qualifications Framework, which implies factual and theoretical knowledge in broad contexts within a field of work or study. It also demands a range of cognitive and practical skills required to generate solutions to specific problems.

In conclusion, the achieved results supported the design of the contents structure of the Robotics qualification that will be created by Portugal, Spain and Cyprus.

Final Course Structure

The final course structure results from the analysis of the suggestions of the survey stage, combined with the remarks from the round tables. It maintains the organisation in mandatory and optional units so as to allow the transferability and recognition in the three countries of the partnership and also to allow the course flexibility and adaptability to different Robotics branches, given its vast applicability.

Some contents have been merged, others have been added or adjusted and there is a consensus regarding the needs of the three countries.

General Aims

The Robotics Technician Course falls into level 4 of the European Qualifications Framework, which implies factual and theoretical knowledge in broad contexts within a field of work or study. It also demands a range of cognitive and practical skills required to generate solutions to specific problems.

Thus, for this course were defined the following general aims:

- Grant a level 4 qualification and professional career in Robotics Technician.
- Enable the student/trainee with the scientific and technical knowledge, and professional skills required to perform the duties of a Robotics Technician.
- Develop autonomous learning and innovation skills that allow the student/trainee to find solutions adapted to the challenges at the workplace.
- Provide the student/trainee with personal skills that allow him to adapt to the constant changes in the work environment.
- Develop appropriate attitudes and behaviours in the scope of Hygiene, Safety and Health at work.
- Grant practical experience through training in the workplace.

Mandatory Contents

- Introduction to Robotics;
- Notions of hygiene and safety at work applied to Robotics;
- Alternating Current / Direct Current
- Power Systems
- Materials Technology - metalworking
- Technical Drawing
- Metrology and quality control
- 3D modelling
- Semiconductors and Transistors
- Logic and Combinational Circuits and Digital Electronics
- Computer-Aided Design
- Analog Electronics
- Industrial Competences
- Quality and Environment Standards

- Hydraulics – initiation
- Pneumatics and Electropneumatics
- Switches and Relays
- Operational Amplifiers
- Programming
- Sensors and Transducers
- IoT - Internet of Things
- Microprocessors and Microcontrollers - applications
- Technology and Assembly of Electronic Equipment
- Printed circuit boards: drawing and printing
- Industrial Equipment
- Soft Skills applied to Industry
- Personal development, entrepreneurship and job search techniques
- Technical English
- Programmable Logic Controllers- control circuits
- Robotics- Planning, Assembly and Applications
- Installation and Maintenance of Electric Machinery and Equipment
- Programmable Logic Controllers applied to Robotics

Optional Contents

- Robotics – programming of industrial manipulators
- Three-phase Systems
- Alternating current electrical machines
- Direct current electrical machines
- Domotics - generalities;
- SMD Electronic components welding
- Microrobotics
- 3D Printing
- Computer Aided Design - general concepts - (CAD) 2D
- Computer Aided Design - 2D applications
- CNC Technology
- CAM Technology
- Electropneumatics - project applied to Mechatronics
- Power Electronics – applications
- Mechanical connection elements
- Technical security devices
- Machine safety standards and design
- Applied mechanics - kinematics
- Business plan – small and medium businesses creation
- Financial system functioning
- Communication in Industrial Environment
- English Language - metal construction - welding, automation and Robotics

Duration of the course

Given the differences encountered in the organisation of the VET courses in Cyprus, Portugal and Spain, the duration of the course will be adjusted to the reality of each country. The essential knowledge will be defined, and for the countries with a more significant number of hours, the course will be complemented with units from the optional group. This will ensure that the core of the course is shared by the three countries and thus transferable among them, but it will also respect the national matrix of the VET courses in each country.