

Basic Questions

for Revising, Adapting and Developing Modules

Smart and Keen Factory – My Trolley Chip

What is the module about?

The module SMART AND KEEN FACTORY will enable teachers and students to create an intelligent factory, where trolley chips can be produced on demands of the customers.

This module is characterized by the fact that a trolley chip assembly machine is envisioned to be constructed, manufactured, built, programmed and used by students of interdisciplinary training courses themselves. This distinguishes it from the work with 4.0 training stations which are on the market available.

Which previous knowledge is required to use this module?

Basic knowledge in ICT software designing, mechanics and electronics. Work with an 3D-Printer and with pneumatic and electrical components.

Which target group is the module addressing?

Teachers, Instructors and Students working on a vocational college or training center in the field of mechatronics and electronics. It will be necessary to form a teacher team to cover all aspects of the module. As an alternative the missing competences can be substituted by the results of the learning modules.

What am I going to learn?

Students will be able to:

- design complex mechanical drawings with 3D CAD
- assemble basic mechanical skills
- design simple electrical and termination drawings
- train basic wiring skills
- maintain hardware Projection
- manage PLC fieldbus connection
- design EN60848 Grafcet of medium complexity
- design hierarchical MAIN/PART Grafcet Access. (e.g. Automatic, Manual, Maintenance, Data Management,..)
- design HMI Access
- transfer Grafcet to Code in FUP, LADDER or AWL, SCL



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Internet of Things – Plant Irrigation

What is the module about?

Intelligent real time plant irrigation controlled by web or mobile (manually or automatically)

Subdivided in 5 integrated submodules:

- Electronics
- Linux operating system and sensors data exchange
- Real time Database
- Hybrid Application
- Statistics

What previous knowledge is required to use this module?

Depending of each submodule basic knowledge of:

- Electronics
- Linux operating system and programming
- Database
- Mobile and web development
- Javascript frameworks

In each submodule there is a guide to start learning the basics of each.

Which target group is the module addressing?

Vocational Education and Training students and teachers of:

- Technician in Telecommunications Installations
- Technician in Microcomputer Systems and Networks
- Higher Technician in Development of Web Applications
- Higher Technician in Multi-platform Applications Development

What am I going to learn?

Electronics, Sensors data and interaction, Microcontrollers, Connections, Raspberry Pi, Python, E-Cloud, Internet Of Things, Real time database, Mobile and web app development , Angular, Ionic, CharJs



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Inelligent House 4.0 – Smart Light Control

What is the module about?

This module develops and increases competences of using the technology of smart home systems.

In a first step, an overview and an introduction into the topic of smart home will take place.

In a second step by using the “smart wall” teachers and trainers are able to use existing and to create new learning situations with smart home systems, beginning with simple tasks up to complex control settings.

Existing learning situation using the “smart wall” are:

- Light control by installation and configuration of a smart home plug and a two-way 230V circuit with smart home switches.
- Integration of Phillips Hue Bulbs

In a third step the module can be extended by the following topics or submodules:

- Security (e.g. intrusion alarm combined with video control)
- Energy efficiency (e.g. heating control combined with window monitoring)
- Comfort (shutter control by different scenarios, integration of voice control)

What previous knowledge is required to use this module?

- Basics with installing and configuration of different apps for controlling the smart devices as well as for documentation and evaluation of the tasks of the students.
- Basics of using FAQs and the online information of the manufacturers.
- Basics of electric circuits.
- Basics of network communication (e.g. communication between smart home controller, smart home devices, mobile devices and the cloud of e.g. Bosch or Phillips)

Only for using components with 230V power supply like switches:

- Basics of function and wiring of electrical house installation.
- Danger of 230V power supply
- First aid in case of an electrical accident
- The security roles when you will work with 230V power supply



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Which target group is the module addressing?

Teachers and trainers for:

- Electronics technicians in industry and handcraft like:
- Electronics technician – specialising in energy and building technology
- Electronics technician for industrial engineering
- Information technology and telecommunications system electronic technician (m/f)

as well as

- Other technicians in the professional field of building service engineering, e.g.
- Plant mechanic for sanitary, heating and air conditioning systems



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Digital Factory for Individualized Products

What is the module about?

In the context of Industry 4.0, the processes and links of digitized production are exemplarily conveyed. A practical example, chosen by the students, will be used to work out how a mass-produced item will be used to develop an individual product tailored to the individual customer.

Which previous knowledge is required to use this module?

The teacher should have experience in the following areas:

- Basics of data processing
- CNC technologies
- CAD systems 2D / 3D
- Rapid Prototyping (3D-Printing)
- Data security Standard Office Software

Which target group is the module addressing?

Target groups are all trainees who are working in developing and producing industrial goods in the occupation areas of Mechanical Engineering and Plastics Engineering:

- Industrial Mechanic
- Machine and plant operator
- Milling machine operator
- Technical product designer specialising in machinery and plant construction
- Tools mechanic

Precision machinist

What am I going to teach?

As a teacher/trainer, in this module you will teach how to set up and operate a digital production chain for simple, customizable, die-cast plastic objects. You teach to understand the digital processes by assembling an individualized mass-product. Your Students will be able to design an individualized product on basis of a mass-produced article. They are able to control the production by cloud-computing application.

Data security claims should be widely considered to be workable.



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General Teaching Module – Introduction

What is the module about?

In this module you will become aware of the changes and challenges of the working world 4.0.

The characteristics of 4.0 technologies will be pointed out and their advantages and challenges can be reflected.

You are invited to check your actual 4.0 competences and to reflect on your future role. You will be able to define your need for further development but also to develop own 4.0 modules for your students.

Which previous knowledge is required to use this module?

As it is a module to introduce the working world 4.0, there is no special previous knowledge except from usual competences of a teacher or trainer required.

Which target group is the module addressing?

This module is focussed on teachers and trainers who are familiar with the industrial sector and electronics and mechatronics. But several aspects are also interesting for educators in general.

What am I going to learn?

- to become aware of changing work processes
- to recognize advantages and challenges of 4.0 technologies
- to become aware of implications for the society and the daily life
- to reflect the changing role of teachers
- to be able to define my own need for further development
- to develop modules for my specific learning group



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