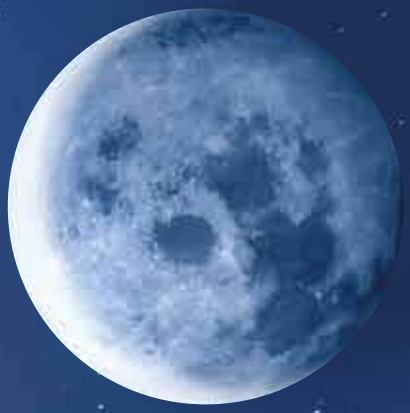
INDUSTRY

4.0



LIST OF COURSES

EMT SYSTEMS

ENGINEERING TRAINING CENTER

Industry 4.0 Competences

MECHANICAL ENGINEERING

INDUSTRIAL PNEUMATICS

- ☐ **P1:** Pneumatics - basic course
- ☐ **P2:** Industrial electropneumatics
- ☐ **P3:** Design and simulation of pneumatic and electropneumatic systems
- ☐ **P4:** Basics of vacuum technology
- ☐ **P5:** Industrial pneumatics according to client's individual needs (c)

POWER HYDRAULICS

Stationary hydraulics

- ☐ **H1:** Power hydraulic components and systems – construction and operation
- ☐ **H2:** Hydraulic drives and control systems in machines and devices
- ☐ **H3:** Proportional hydraulics and electrohydraulics
- ☐ **H4:** Servohydraulic drives and control systems
- ☐ **H5:** Diagnostics, maintenance and repairs of hydraulic devices and systems
- ☐ **H6:** Design of hydraulic drives and control systems
- ☐ **H7:** Energy efficiency of hydraulic drives
- ☐ **H8:** Servohydraulic drives: modeling, identification, control (c)

Mobile hydraulics

- ☐ **HM1:** Mobile hydraulics in machines and devices
- ☐ **HM2:** Hydraulic drives and control systems in mobile hydraulics
- ☐ **HM3:** Basics of IQAN control system (c)

Hydraulic fluid

- ☐ **HC1:** Hydraulic fluid parameters – control and analysis

Hydrotronics

- ☐ **HT1:** Hydrotronics – basic course (c)
- **HT2:** Hydrotronics – advanced course (c)

CNC LATHES AND MILLING MACHINES

Trainings for CNC programmers and operators

- ☐ **CNC1:** Operation and programming of numerically controlled machine tools – CNC operator
- ☐ **CNC2:** Design of technological processes – CNC technologist / tool setter
- ☐ **CNC3:** Computer aided manufacturing – CAM programmer
- ☐ **CNC4-P:** Operation and programming of the machine tools with HEIDENHAIN control
- ☐ **CNC4-Z:** Advanced operation and programming of CNC machine tools with HEIDENHAIN control

(c) - closed training

Specialized trainings

- ☐ **CNC5:** Programming and operation of CNC machines with FANUC control system
- ☐ **CNC6:** Operation of CNC machines with SINUMERIK control system (c)
- ☐ **CNC7:** Programming and operation of CNC machines with MAZATROL control system (c)
- ☐ **CNC8:** Operating and programming CNC machines with OKUMA control system (c)
- ☐ **CNC9:** Operating and programming CNC machines according to client's individual needs (c)

CONVENTIONAL MACHINE TOOLS

- ☐ **OBR:** Operation of conventional machine tools

MECHANICAL ENGINEERING

Maintenance

- ☐ **PKM1:** Basics of machine construction for mechanics
- ☐ **PKM2:** Design and utilization of bearings
- ☐ **PKM6-UR:** Vibratory feeders for maintenance
- ☐ **PKM8:** Hydraulic, pneumatic, rotary and static seals

Engineers

- ☐ **PKM3:** Technical drawing
- ☐ **PKM4:** Geometric dimensioning and tolerancing ISO-ASME/GD&T with coordinate techniques
- ☐ **PKM5:** Basics of machine construction for construction engineers
- ☐ **PKM6-K:** Designing vibratory feeders
- ☐ **PKM7:** Technical mechanics – maintenance (c)

MACHINE DIAGNOSTICS

- ☐ **DM1:** Vibrodiagnostics with elements of utilization - level 1
- ☐ **DM2:** Vibrodiagnostics of industrial systems – level 2
- ☐ **DM3:** Advanced diagnostic methods – level 3 (c)
- ☐ **DM4:** Thermographic diagnostics (c)

VISUALISATION AND CONTROL SYSTEMS

ELECTRICAL ENGINEERING AND AUTOMATION

- ☐ **AM1:** Electrical engineering and control cabinet equipment
- ☐ **AM2:** Introduction to industrial automation and control systems
- ☐ **AM3:** Safety systems and devices in industrial automation
- ☐ **NAP1:** Basics of drive systems

VISION SYSTEMS

- ☐ **SW1:** Industrial 2D and 3D vision systems

SIEMENS S7-300/400

- ☐ **PLC 1:** SIEMENS SIMATIC S7-300/400 programming – basic course
- ☐ **PLC2:** SIEMENS SIMATIC S7-300/400 programming – advanced course
- ☐ **PLC3:** SIEMENS SIMATIC S7-300/400 – diagnostics
- ☐ **PLC4:** PROFIBUS DP – SIEMENS SIMATIC S7-300/400 communication
- ☐ **PLC5:** S7-GRAPH sequence programming
- ☐ **PLC6:** S7-SCL programming

SIEMENS S7 MIGRATION STEP7- TIA PORTAL

- ☐ **TIAM1:** STEP7 to TIA Portal project migration
- ☐ **TIAM2:** Operating and programming S7-1500 controllers in TIA Portal for STEP7 users

SIEMENS S7-300/400 TIA PORTAL

- ☐ **TIA2:** PLC SIEMENS SIMATIC S7-300/400 programming in TIA Portal – basic course
- ☐ **TIA3:** PLC SIEMENS SIMATIC S7-300/400 programming in TIA Portal – advanced course

SIEMENS SIMATIC S7-1500 / S7-1200 TIA PORTAL

- ☐ **TIAM2:** Operating and programming S7-1500 controllers in TIA Portal for STEP7 users
- ☐ **TIA1200-1:** SIEMENS SIMATIC S7-1200 programming in TIAPortal – level 1
- ☐ **TIA1200-2:** SIEMENS SIMATIC S7-1200 programming in TIAPortal – level 2
- ☐ **TIA1500-1:** SIEMENS SIMATIC S7-1500 programming – level 1
- ☐ **TIA1500-2:** SIEMENS SIMATIC S7-1500 programming – level 2
- ☐ **TIA-DIAG:** SIEMENS SIMATIC S7-1500/1200 diagnostics in TIA Portal – level 3
- ☐ **TIA-EKSPERT:** Technological functions and advanced programming of SIMATIC S7-1500/1200 in TIA Portal
- ☐ **SAF1500:** Programming and designing in Step 7 Safety Advanced in SIMATIC Safety Integrated S7-1500 controllers
- ☐ **TIA-SCL:** S7-SCL programming in TIA Portal
- ☐ **TIA-STL:** S7-STL programming in TIA Portal
- ☐ **TIA1500-T:** Motion Control functions of S7-1500T controller

SIEMENS SAFETY INTEGRATED

- ☐ **SAF300:** Programming and designing with Distributed Safety in Simatic Safety Integrated Controllers
- ☐ **SAF1500:** Programming and designing in Step 7 Safety Advanced in SIMATIC Safety Integrated S7-1500 controllers

HMI/SCADA

- ☐ **TIAW1:** WinCC HMI Panels in TIA Portal
- ☐ **TIAW2:** WinCC SCADA in TIA Portal
- ☐ **W1:** WinCC SCADA
- ☐ **W2:** WinCC flexible – Operator panels
- ☐ **W3:** PM-Server / PM-Quality – Configuration and administration (z)

INDUSTRIAL NETWORKS

- ☐ **SP1:** AS-Interface
- ☐ **SP2:** PROFIBUS DP diagnostics
- ☐ **SP3:** PROFINET S7
- ☐ **SP3-TIA:** PROFINET in TIA
- ☐ **SP3-DIAG:** PROFINET diagnostics
- ☐ **SP4:** CAN and CANopen
- ☐ **SP5:** AS-I/S7 automation systems integrator (c)
- ☐ **SP6:** Industrial Ethernet in practice
- ☐ **PLC4:** PROFIBUS DP – SIEMENS SIMATIC S7-300/400 communication

CYBERSECURITY

- ☐ **CB1:** Cybersecurity for industrial automation – protecting SCADA systems – level 1
- ☐ **CB2:** Cybersecurity of industrial control systems - level 2
- ☐ **CB3:** Cybersecurity for industrial automation - according to client's needs (C)

SIMATIC PCS7

- ☐ **PCS7-UR:** SIMATIC PCS7 in maintenance
- ☐ **PCS1:** SIMATIC PCS7 – basics of developing applications

CODESYS

- ☐ **CDS1:** CoDeSyS 2.3 – PLC programming
- ☐ **CDS2:** CoDeSyS 3.5 – PLC programming

DRIVE SYSTEMS

- ☐ **NAP1:** Basics of drive systems

SIEMENS drive systems

- ☐ **TNS1-TIA:** SIEMENS Sinamics G120 in TIA Portal – configuration, starting and diagnostics
- ☐ **TNS1:** SIEMENS Sinamics G120
- ☐ **TNS2:** SIEMENS Micromaster 4 drive systems
- ☐ **TNS3-TIA:** Siemens Sinamics S120 in TIA Portal – configuration, launch and diagnostics
- ☐ **TNS3:** SIEMENS Sinamics S120 – configuration,

launch, diagnostics
- ☐ **TNS4:** SIEMENS Simotion – configuration, launch, diagnostics
- ☐ **TNS5:** SIMOCODE PRO - design and parametrization
- ☐ **TIA1500-T:** Motion Control functions of S7-1500T controller

INDUSTRIAL SENSORS
- ☐ **S1:** Sensors in industrial applications
- ☐ **S2:** IO-Link interface – quick reconfiguration of the sensor process parameters
- ☐ **S3:** Industrial sensors according to client's needs (c)

MITSUBISHI
- ☐ **MTB-F:** MTB-FProgramming MITSUBISHI logic controllers, series MELSEC-F
- ☐ **MTB-Q1:** Programming MITSUBISHI logic controllers, series MELSEC-Q - level 1
- ☐ **MTB-Q2:** Programming MITSUBISHI logic controllers, series MELSEC-Q - level 2
- ☐ **MTB-HMI1:** - Programming Mitsubishi GOT operator panels in GTWORKS3

C AND C++ PROGRAMMING
- ☐ **PR1:** C/C++ programming (c)
- ☐ **PR2:** Programming AVR and ARM microcontrollers using Arduino platform and Atmel Studio (c)
- ☐ **PR3:** Object-oriented programming in C/C# – basic course (c)
- ☐ **PR4:** Programming of STM3 microcontrollers with the use of HAL and CMSIS libraries and FreeRTOS system – basic course (c)

INDUSTRIAL ROBOTS

FANUC ROBOTS
- ☐ **RF1:** FANUC industrial robots programming – level 1
- ☐ **RF2:** FANUC industrial robots programming – level 2
- ☐ **RF3:** FANUC off-line industrial robots programming – Roboguide
- ☐ **RF-M:** Migration to operation and on-line programming of fanuc industrial robots (c)

ABB ROBOTS
- ☐ **RA1:** ABB industrial robots programming – level 1
- ☐ **RA2:** ABB industrial robots programming – level 2

KUKA ROBOTS
- ☐ **RK1:** KUKA industrial robots programming – level 1
- ☐ **RK2:** KUKA industrial robots programming – level 2
- ☐ **RK-I:** The integration of KUKA robots and PLC SIEMENS SIMATIC controller

YASKAWA ROBOTS
- ☐ **RY1:** YASKAWA industrial robots programming – level 1

COMAU ROBOTS
- ☐ **RC:** YASKAWA industrial robots programming and operation (c)

INDUSTRIAL ROBOTS INTEGRATION
- ☐ **RK-I:** The integration of KUKA robots and PLC SIEMENS SIMATIC controller
- ☐ **RI2:** The integration of KUKA / ABB robots and SINUMERIK controlled CNC machine

MATERIAL ENGINEERING

PLASTICS
Properties and tests
- ☐ **TS1:** Plastics and their properties

Design
- ☐ **TS2:** Designing components made of plastics
- ☐ **TS5:** Designing injection moulds

Processing of thermoplastics
- ☐ **TS3:** Thermoplastic injection moulding – operating and technology
- ☐ **TS4:** Plastics processing – extrusion (c)
- ☐ **TS7:** Blow Moulding (c)

Tool shop and technical service
- ☐ **TS6:** Exploitation of injection moulds

POLYMER COMPOSITES
- ☐ **KP1:** Chemoset and thermoset polymeric composites – introduction to polymer chemistry, composite properties and manufacturing methods
- ☐ **KP2:** Technical evaluation of the quality of polymer composites

3D PRINTING
- ☐ **3D1:** 3D printing in FDM technology – basic course
- ☐ **3D2:** 3D printing in FDM technology – advanced course
- ☐ **3D3:** 3D printing technologies

HEAT TREATMENT

- ☐ **OC-O:** Heat treatment of metal engineering materials
- ☐ **OC-Z:** Heat treatment according to client's needs (c)

PLASTIC FORMING

- ☐ **OP1:** Press-forming: basic course
- ☐ **OP2:** Press forming according to client's needs (c)

RESISTANCE WELDING

- ☐ **ZO1:** Programming and parameterization of resistance welding machines – basic course(c)
- ☐ **ZO2:** Programming and parameterization of resistance welding machines – advanced course (c)
- ☐ **ZO3:** Programming of BOSCH adaptive welding controllers – specialist course (c)
- ☐ **ZO4:** Programming of ARO adaptive welding controllers – specialized course (c)
- ☐ **ZO5:** Basics of resistance microwelding theory (c)

MACHINERY SAFETY

STANDARDS AND DIRECTIVES FOR MACHINERY

- ☐ **BM1:** The assessment of conformity of machines and devices against the requirements of applicable directives (terms of CE marking)
- ☐ **BM2:** Machine and device operation (according to 2006/42/WE and 2009/104/WE directives)
- ☐ **BM3:** Pressure Equipment Directive (PED) requirements – 2014/68/UE (c)
- ☐ **BM4:** The construction and operation of technical devices applied in potentially explosive atmospheres (requirements of directives ATEX (2014/34/EU) and Ex (1999/92/EC)) (c)
- ☐ **BM5:** Declaration of conformity and CE marking (requirements of directive 2014/35/EU and related regulations) (c)

SAFETY SYSTEMS

- ☐ **SAF300:** Programming and designing with Distributed Safety in SIMATIC Safety Integrated Controllers
- ☐ **SAF1500:** Programming and designing in Step 7 Safety Advanced in SIMATIC Safety Integrated S7-1500 controllers

PRODUCTION QUALITY

QUALITY MANAGEMENT

- ☐ **KJ1:** Quality management and quality ethics (c)
- ☐ **KJ2:** Computer-aided quality assurance – CAQ (c)
- ☐ **KJ3:** MSA – Measurement System Analysis (c)
- ☐ **KJ4:** SPC – Statistical Process Control (c)
- ☐ **KJ5:** 3D scanning for dimensional inspection, SPC and CAQ (c)
- ☐ **KJ-O:** Improving quality processes for production management

METROLOGY

- ☐ **MR1:** Industrial metrology
- ☐ **MR2:** Coordinate measuring method (c)
- ☐ **MR3:** Compilation of measurement results (c)

ANALYSIS OF MEASUREMENTS

- ☐ **AP1:** Descriptive statistics (c)
- ☐ **AP2:** Measurement uncertainty calculation (c)
- ☐ **AP3:** Compilation of measurement results (c)
- ☐ **AP4:** Legal metrology and arranging a research laboratory and a calibration laboratory (c)

PRODUCTION QUALITY MANAGEMENT

TOTAL PRODUCTIVE MAINTENANCE

- ☐ **TPM1:** Maintenance management according to TPM and TOC
- ☐ **TPM2:** Maintenance management according to TPM – level 2
- ☐ **TPM3-P:** TPM Leader: how to manage maintenance department – basic course
- ☐ **TPM3-Z:** TPM Leader: how to manage maintenance department – advanced course
- ☐ **TPM4:** Process optimization in maintenance
- ☐ **TPM5:** Statistical methods in TPM
- ☐ **TPM6:** Developing KPI factors in maintenance
- ☐ **TPM7:** Cost management in maintenance

SMED METHODOLOGY

- ☐ **SMED1:** Single-Minute Exchange of Die
- ☐ **SMED2:** Methods Time Management in Single-Minute Exchange of Die

FMEA METHODOLOGY

- ☐ **FMEA1:** Machinery Failure Mode and Effects Analysis
- ☐ **FMEA2:** PFMEA - Process Failure Mode Effects Analysis (4th edition, June 2008 by AIAG)
- ☐ **FMEA3:** Design Failure Mode Effects Analysis (4th edition, June 2008 by AIAG)
- ☐ **FMEA4:** FMEA-MSR – FMEA for Monitoring and System Response (1st edition by AIAG & VDA QMC, June 2019)
- ☐ **FMEA5:** PFMEA - Process Failure Mode and Effects Analysis (1st edition by AIAG & VDA QMC (5th by AIAG), June 2019) (c)
- ☐ **FMEA6:** DFMEA - Design Failure Mode Effects Analysis (1st edition by AIAG & VDA QMC (5th by AIAG), June 2019) (c)

LEAN MANUFACTURING

- ☐ **LEAN1:** Lean management – basic course (c)
- ☐ **LEAN2:** Workplace organization with 5S method (c)
- ☐ **LEAN3:** VSM and process optimization (c)
- ☐ **LEAN4:** Planning and organization of the production (c)
- ☐ **LEAN5:** Workplace organization with 5S method (c)

SIEMENS PLM

SIEMENS NX

- ☐ **NX CAD1:** Basic course
- ☐ **NX CAD2:** Intermediate course
- ☐ **NX CAD3:** Migration course (c)
- ☐ **NX CAD4:** Advanced course (c)
- ☐ **NX CAM1:** Basic course
- ☐ **NX CAM2:** Turning (c)
- ☐ **NX CAM3:** Milling (c)
- ☐ **NX CAM4:** Multi axis milling (c)
- ☐ **NX DW:** Die Wizard – die tools (c)
- ☐ **NX SM:** Sheet metal (c)
- ☐ **NX D:** Drafting (c)
- ☐ **NX MFF:** Freeform Modeling
- ☐ **NX AS:** Advanced Simulation (c)
- ☐ **NX LM:** Laminat Modeling (c)
- ☐ **NX MS:** Motion Simulation (c)
- ☐ **NX:** NX Selection (c)

SIEMENS SOLID EDGE

- ☐ **SE1:** Solid Edge – practical basics of programming
- ☐ **SE2:** Solid Edge – advanced design aid

BUILDING AUTOMATION AND RES

BUILDING AUTOMATION

- ☐ **AB1:** Electrical installations in residential and commercial buildings (soon)
- ☐ **AB2:** Intelligent building automation

RENEWABLE ENERGY SOURCES FOR BUILDINGS

- ☐ **OZE1:** Basics of photovoltaics
- ☐ **OZE2:** Designing photovoltaic systems