UniTrain SYSTEM Course and Equipment Overview

Courses

Applications

Electrical power engineering

Photovoltaics
SO4204-3A

Transient processes in DC and AC networks
SO4204-3B

Fuel cell technology
SO4204-3C

Electric machines

DC machines
SO4204-7S 1

Asynchronous machines
SO4204-7T 1

Synchronous and slip-ring machines
SO4204-7U 1

Stepper motor
SO4204-7W

Linear motor
SO4204-7X 1

Three-phase transformer
SO4204-7Y 1

BLDC / Servo motors
SO4204-7Z 1

Power electronics

Self-commutated power converters single-phase/3-phase
SO4204-7M 1 1

Line-commutated power converters single-phase/3-phase
SO4204-7N 1 1

Frequency converter drives
SO4204-7P
Requires SO4204-7M and SO4204-7T 2 1

Active power factor correction PFC
SO4204-7Q 1

Communication technology

Quadripoles and filters
SO4204-9A

Coaxial cables
SO4204-9D

Fibre optics
SO4204-9E 1

4-wire lines
SO4204-9F

Pulse modulation PAM/PCM/Delta
SO4204-9J 2

Pulse modulation PTM
SO4204-9K

Modem methods ASK, PSK, FSK
SO4204-9L 1

AM/FM Modulation/Demodulation
SO4204-9M 1

AM transmission and receiving technology
SO4204-9N 2 1

TCP/IP
SO4204-9Q 1

Supplement to SO4204-9Q
Client integration
SO4204-9R 1

Data acquisition using RFID
SO4204-9S 1

Introduction to microwave technology
SO4204-9U

Supplement to SO4204-9U
Waveguide components
SO4204-9V

Basics of antenna technology
SO4204-9W

Supplement to SO4204-9W
Complex antenna systems
SO4204-9X

Microstrip technology
SO4204-9Y

Introduction to DSP
SO4204-6P

Supplement to SO4204-6P
Applied DSP
SO4204-6Q

In preparation
Active filters
SO4204-9B

In preparation
Signal generators
SO4204-9C

Automatic control technology

Practical introduction to closed-loop control
SO4204-8E 1

Analysis of control loops
SO4204-8F 1

Supplement to SO4204-8F
Controller design & optimisation
SO4204-8G 1

Supplement to SO4204-8G
WINFACT software, numeric and Fuzzy control
SO6001-5Q

Servo motor technology
SO4204-8H

Measurement technology

Meas. of electrical variables V, I, P, cos phi, f
SO4204-8A 1

Meas. of non-electrical variables temperature, pressure, force
SO4204-8B 1

Meas. of non-electrical variables displacement, angle, speed
SO4204-8C 1

RLC measurements
SO4204-8D 1

Microcomputer technology

Fundamentals of computer technology
SO4204-6H

Supplement to SO4204-6H
Applications and programming
SO4204-6J 1

Automation technology

Compact automation: PLC and bus technology
SO4204-8N 2 1

PLC model lift application
SO4204-8T 1

Sensors for automation
SO4204-8U 1

Pneumatics / Electropneumatics
SO4204-8V 1

Process technology: Compact station
SO4204-3E 1 1

Process technology: Mixing station
SO4204-3F 1 1

In preparation
Process technology: Filling station
SO4204-3G 1

In preparation
Process technology: Corking station
SO4204-3H 1

Transfer system with DC drive
SO4204-8K 1

Transfer system with three-phase drive
SO4204-8L 1

Sorting subsystem
SO4204-8M 1

Assembly subsystem
SO4204-8O 1

Process subsystem
SO4204-8P 1

Testing subsystem
SO4204-8Q 1

Handling subsystem
SO4204-8R 1

Storage subsystem
SO4204-8S 1

Routing subsystem
SO4204-8W 1

Buffering subsystem
SO4204-8X 1

Automotive technology

DC and AC circuits in vehicles
SO4204-7A

Electronics and digital technology in vehicles
SO4204-7B

Pulse generation and ignition systems
SO4204-7C

Alternator / three-phase generator
SO4204-7D 1 1

LIN bus
SO4204-7E 1

Sensors in motor vehicles
SO4204-7F 1

In preparation
Communication with RFID
SO4204-7G

Optical data buses for automotive applications
SO4204-7H

PWM in automotive engineering
SO4204-7J 1

CAN bus
SO4204-7K 1

Hybrid automotive drives
SO4204-6V 2 1

Common Rail Diesel injection system
SO4204-6X

Airbag
SO4204-6Z 1

Traction control systems: ABS, TCS, ESP
SO4204-6W

Fuel cell technology
SO4204-6M

Solar technology in vehicles
SO4204-6N

FlexRay
SO4204-6Y

In preparation
Keyless entry
SO4204-6G 1

Fundamentals

Electrical engineering

DC technology
SO4204-4D

AC technology
SO4204-4F

Three-phase technology
SO4204-4H 1 1

Magnetism/electromagnetism
SO4204-4A

Conducting measurements with the multimeter
SO4204-4B 1

Electrical network analysis
SO4204-4C

EMC
SO4204-4K

Measurements using an oscilloscope
SO4204-4L

Protective measures and power network types
SO4204-4M 1

Control technology / contactor circuits
SO4204-4N 1

Electronics

Semiconductor components
SO4204-5A

Transistor multivibrators
SO4204-5D

Transistor and amplifier technology
SO4204-5H

Field-effect transistors
SO4204-5K

Operational amplifiers
SO4204-5M

Power semiconductors
SO4204-5P 1

Analogue power supplies
SO4204-5R

Switched-mode power supplies
SO4204-5S

Electronic circuit design

Circuit design using NI Multisim
SO4204-5U

PCB layout with NI Ultiboard
SO4204-5V

In preparation
Prototype assembly and testing
SO4204-5W

Digital technology

Gates and flip-flops
SO4204-6A

Sequential circuits
SO4204-6C

Application circuits
SO4204-6E

Converter circuits
SO4204-6F

Project work

Project work

Breadboard with set of cables	SO4203-2C
Proto printed circuit board, solderable	SO4201-2L
Circuit simulation software NI Multisim	SO2002-2A

Component kits

DC technology	SO4204-1A
AC technology	SO4204-1D
Rectification	SO4204-1G
Transistor switch	SO4204-1K
Three-phase technology	SO4204-1N 1
Electronic components	SO4204-2A
Transistor circuits	SO4204-2D
Operational amplifiers	SO4204-2G
Signal generation	SO4204-2K
Digital technology	SO4204-2P
DC motor	SO4204-2Q

Note

All courses supplementing the basic equipment include the required experiment hardware, a CD-ROM with the learning program, LabSoft and Virtual Instruments as well as required accessories.

Basics

Basic equipment

UniTrain-I Interface	SO4203-2A
UniTrain-I Experimenter	SO4203-2B
UniTrain-I measurement accessories - Set of shunts - Connection cables - Connecting plugs	SO4203-2J
UniTrain-I storage case	SO4203-2Y

Essential supplements

Extended power supply	SO4203-2D
UniTrain-I Experimenter	SO4203-2B
Probe 10:1/1:1	LM9036

Optional measurement equipment

Digital multimeter	LM2330

To make use of the IR-interface of the multimeter we recommend an additional experimenter

UniTrain-I experimenter	SO4203-2B