

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
- Asynchronous machines SO4204-7T
- Synchronous and slip-ring machines SO4204-7U
- Stepper motor SO4204-7W
- Linear motor SO4204-7X
- Three-phase transformer SO4204-7Y
- BLDC / Servo motors SO4204-7Z

Power electronics

- Self-commutated power converters single-phase/3-phase SO4204-7M
- Line-commutated power converters single-phase/3-phase SO4204-7N
- Frequency converter drives SO4204-7P
Requires SO4204-7M and SO4204-7T
- Active power factor correction PFC SO4204-7Q

Communication technology

- Quadrupoles and filters SO4204-9A
- Coaxial cables SO4204-9D
- Fibre optics SO4204-9E
- 4-wire lines SO4204-9F
- Pulse modulation PAM/PCM/Delta SO4204-9J
- Pulse modulation PTM SO4204-9K
- Modem methods ASK, PSK, FSK SO4204-9L
- AM/FM Modulation/Demodulation SO4204-9M

AM transmission and receiving technology

- TCP/IP SO4204-9Q
- Supplement to SO4204-9Q
- Client integration SO4204-9R

Data acquisition using RFID

- SO4204-9S

Introduction to microwave technology

- 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

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

Analysis of control loops

- SO4204-8F

Supplement to SO4204-8F

- Controller design & optimisation SO4204-8G

Supplement to SO4204-8G

- WINFACT software, numeric and Fuzzy control SO6001-5Q

Measurement technology

Meas. of electrical variables V, I, P, cos phi, f

- SO4204-8A

Meas. of non-electrical variables temperature, pressure, force

- SO4204-8B

Meas. of non-electrical variables displacement, angle, speed

- SO4204-8C

RLC measurements

- SO4204-8D

Microcomputer technology

Fundamentals of computer technology

- SO4204-6H

Supplement to SO4204-6H

- Applications and programming SO4204-6J

Automation technology

Compact automation: PLC and bus technology

- SO4204-8N

PLC model lift application

- SO4204-8T

Sensors for automation

- SO4204-8U

Pneumatics / Electropneumatics

- SO4204-8V

In preparation

- Process technology: Compact station SO4204-3E

In preparation

- Process technology: Mixing station SO4204-3F

In preparation

- Process technology: Filling station SO4204-3G

In preparation

- Process technology: Corking station SO4204-3H

Transfer system with DC drive

- SO4204-8K

Transfer system with three-phase drive

- SO4204-8L

Sorting subsystem

- SO4204-8M

Assembly subsystem

- SO4204-8O

Process subsystem

- SO4204-8P

Testing subsystem

- SO4204-8Q

Handling subsystem

- SO4204-8R

Storage subsystem

- SO4204-8S

Routing subsystem

- SO4204-8W

Buffering subsystem

- SO4204-8X

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

LIN bus

- SO4204-7E

Sensors in motor vehicles

- SO4204-7F

Optical data buses for automotive applications

- SO4204-7H

PWM in automotive engineering

- SO4204-7J

CAN bus

- SO4204-7K

Hybrid automotive drives

- SO4204-6V

Common Rail Diesel injection system

- SO4204-6X

Airbag

- SO4204-6Z

In preparation

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

Fuel cell technology

- SO4204-6M

Solar technology in vehicles

- SO4204-6N

In preparation

- FlexRay SO4204-6Y

Electrical engineering

- DC technology SO4204-4D
- AC technology SO4204-4F
- Three-phase technology SO4204-4H
- Magnetism/electromagnetism SO4204-4A
- Conducting measurements with the multimeter SO4204-4B
- Electrical network analysis SO4204-4C
- EMC SO4204-4K

Protective measures and power network types

- SO4204-4M
- Control technology / contactor circuits SO4204-4N

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

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

- 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
- 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.

Fundamentals

Basics

Basic equipment

- UniTrain-I Interface SO4203-2A
- UniTrain-I Experimenter SO4203-2B
- UniTrain-I measurement accessories 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