

Courses

Course	Applications
Electrical power engineering SO4204-3A 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 Quadripoles 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
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 Servo motor technology SO4204-8H	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 Process technology: Compact station SO4204-3E Process technology: Mixing station SO4204-3F In preparation Process technology: Filling station SO4204-3G In preparation Process technology: Corking station SO4204-3H
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 In preparation Communication with RFID SO4204-7G Optical data buses for automotive applications SO4204-7H PWM in automotive engineering SO4204-7J	AM transmission and receiving technology SO4204-9N Supplement to SO4204-9Q Client integration SO4204-9R Data acquisition using RFID SO4204-9S Introduction to microwave technology SO4204-9U Supplement to SO4204-9U Waveguide components SO4204-9V Basics of antenna technology SO4204-9W 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
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 SO4204-8V Buffering subsystem SO4204-8X	CAN bus SO4204-7K Hybrid automotive drives SO4204-6V Common Rail Diesel injection system SO4204-6X Airbag SO4204-6Z 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

Fundamentals

Course	Project work	Component kits
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	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
Electronics Semiconductor components SO4204-5A Transistor multivibrators SO4204-5D Transistor and amplifier technology SO4204-5H Field-effect transistors SO4204-5K	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
Measurements using an oscilloscope SO4204-4L Protective measures and power network types SO4204-4M Control technology / contactor circuits SO4204-4N	Operational amplifiers SO4204-5M Power semiconductors SO4204-5P Analogue power supplies SO4204-5R Switched-mode power supplies SO4204-5S	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

Basics

Equipment	Essential supplements	Optional measurement equipment
Basic equipment UniTrain-I Interface SO4203-2A UniTrain-I Experimenter SO4203-2B UniTrain-I measurement accessories SO4203-2J - Set of shunts - Connection cables - Connecting plugs 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