

Dette er en oversettelse av den fastsatte læreplanteksten. Læreplanen er fastsatt på Bokmål

Laid down as a regulation by the Norwegian Directorate for Education and Training on 10 March 2008 as delegated in a letter of 26 September 2005 from the Ministry of Education and Research pursuant to the Act of 17 July 1998 no. 61 relating to primary and secondary education (Education Act) Section 3-4 first paragraph.

Valid from 01.08.2008

Valid to 31.07.2016



Utgått

Purpose

The common programme subject for Automation shall contribute to functionality, safety and high quality production for land-based industries, shipping and offshore oil and gas production. The subject shall contribute to a high level of effectiveness, adaptability and innovation in the use of automated production methods.

Learning in the subject of Automation shall promote the pupil's knowledge and understanding of systems and the ability to see the interrelationship between technology systems, processing plants, machines and installations. The subject shall help pupils gain competence in planning, installing, operating and maintaining automation plants in accordance with current rules and regulations. Automation shall improve the pupil's ability to understand economics, systems and equipment, and promote comprehensive thinking and creativity. Automation shall raise the pupil's awareness about local, national and global environmental challenges related to better use of resources and sustainable development.

Learning in Automation shall promote the pupil's independence and ability to cooperate and communicate. Interdisciplinary learning tasks shall form the basis for further in-depth study and specialisation and prepare the pupil for lifelong learning in areas of work where technological development sets the requirements for reorganization, change and acquiring new competence. Learning in the subject shall provide basic knowledge about the working environment and promote independence and cooperation with others in one's own profession and company and with other professionals at other companies, as well as the ability to communicate with users and colleagues. The subject will also promote an understanding of internal control systems, Environment, Health and Safety, value creation from a social perspective, service-mindedness and upholding the company as an organization.

Training completed and passed in the subject will lead to a Trade Certificate. The professional title is Automatician.

Structure

Automation consists of three programme subjects. Programme subjects complement each other, and should be viewed in relation to one another.

Overview of the programme subjects:

Year level	Programme subject
Vg3	Automation systems Mechanical work Electrical power systems

Description of the programme subjects

The programme subject covers working with production processes, machines and installations and their appurtenant security systems. This programme subject also includes programmable management and control systems with digital and analogue signal processing and conditioning, functions testing, troubleshooting, error rectification, maintenance, logging, the use of digital tools, and optimisation. The programme subject also covers measurement and control systems, internal control systems, Environment, Health and Safety, safe job analyses, quality assurance, business studies and an understanding of rules and regulations that apply to this trade.

The programme subject covers planning work tasks, selecting materials, the production and assembly of mechanical elements and products, and assemblage. In addition to this, the programme subject covers troubleshooting, error rectification, repairs, maintenance and testing of components, production machines and processing plants. The programme subject also cover the use of working drawings, procedures, standards and the use of digital tools as a basis for assembly, operation and maintenance.

The programme subject covers electrical installation and maintenance based on safety procedures related to electricity in automated systems in areas where explosives are used and in areas subject to electrical noise. The programme subject also covers the use of documentation, the use of digital tools, reading instructions and understanding rules and regulations that apply to this trade.

Teaching hours

Teaching hours are given in 60-minute units

Vg3

Automation systems 645 teaching hours per year

Mechanical work 140 teaching hours per year

Electrical power systems 140 teaching hours per year

Basic skills

Basic skills are integrated into the competence aims for this course in areas where they contribute to the development of and are a part of the basic subject competence. In Automation, basic skills are understood as follows:

Being able to express oneself orally in Automation involves communicating with customers, colleagues and professionals from other trades. This involves participating in discussions about safety and the choice of professional solutions, planning, guidance and user training

Being able to express oneself in writing in Automation involves planning work tasks and documenting and reporting completed tasks and reporting deviations.

Being able to read in Automation involves understanding subject-specific text, including current rules, directives and customer specification requirements.

Numeracy in Automation involves planning, dimensioning equipment, evaluating measurement results and understanding the relationships within electrical, hydraulic and pneumatic circuits.

Digital and computer literacy in Automation involves communicating with help from automation systems, using digital tools to search for information and the production of technical documents for systems and devices, and searching for help with error rectification. This also involves programming, configuring and troubleshooting different management and control systems.

Competence aims

The aims of the studies are to enable pupils to

- plan, carry out and document the installation and start-up of manipulators, switch/relay/contactors controls and programmable management and control systems for digital and analogue signal processing and conditioning related to electrical, hydraulic, pneumatic and technical process plants

- change and adapt screen images for Man-Machine-Interfaces
- describe and troubleshoot different security systems
- draw, read and explain instrumented process flow diagrams based on current standards
- plan, carry out and document configuration, calibration, assembly and start-up of digital and analogue measuring systems
- plan, carry out and document the installation and start-up of different regulating methods based on process needs
- use manuals and automatic optimisation methods at start-up of processing plants
- plan, carry out and document the installation and start-up of different types of control elements with appurtenant rotating and linear actuators and utility equipment
- measure physical sizes of automation systems and equipment, and use the measurement results in operations and maintenance work
- troubleshoot and correct errors in automation systems, and log and document work
- describe different maintenance systems and routines related to automation systems, and use one of these
- carry out a final control check on work done and evaluate the effectiveness of own work
- explain the company's organizational structure and the company's value creation from a social perspective
- perform work in a professional and precise manner in accordance with safe job analyses, current rules, norms and the manufacturers' technical documentation
- perform work in accordance with requirements for Environment, Health and Safety, routines for quality assurance and internal control systems related to the company's comprehensive value chain
- document own learning and training in the field of automation systems

The aims of the studies are to enable pupils to

- create plans and drawings for work tasks and list the materials needed based on work descriptions
- select the correct materials for working with and joining elements based on working drawings and specifications
- use tools for cutting, sawing and shearing
- use modern machines for mechanical production
- use modern joining methods
- assemble, modify, start, maintain and do functions tests on mechanical equipment
- plan, carry out and document maintenance on regulating valves and other valves based on supplier specifications

- plan, carry out and document maintenance on hydraulic and pneumatic equipment and on plants or installations with appurtenant pipe systems
- carry out a final control check and document work done and evaluate the effectiveness of own work
- perform work in a professional and precise manner in accordance with safe job analyses, current rules, norms and the manufacturers' technical documentation
- perform work in accordance with requirements for Environment, Health and Safety, routines for quality assurance and internal control systems
- document own learning and training in the field of mechanical work

The aims of the studies are to enable pupils to

- plan, install, initiate operation and document power supply to engine drives and automation equipment for different voltage systems in automated and industrial electrical plants
- plan, evaluate and select the correct materials related to automated and industrial electrical plants
- plan, install, initiate operations and document different grounding systems in automated and industrial electrical plants
- give an account of work done on equipment in areas exposed to the risk of explosions based on current rules
- identify, evaluate and implement measures related to electrical noise sourced in automated and industrial electrical plants
- use digital tools to document work on electrical plants
- give necessary first-aid in case of electrical current flow accidents
- carry out a final control check on work done and evaluate the quality of own work
- perform work in a professional and precise manner in accordance with safe job analyses, current rules and the manufacturers' technical documentation
- perform work in accordance with requirements for Environment, Health and Safety, routines for quality assurance and internal control systems
- document own learning and training in the field of electrical power systems

Assessment

Vg3 Automation

Provisions for final assessment:

Overall achievement grades

Programme subject	Provision
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Automation systems	The pupil shall have an overall achievement grade in each programme subject.
Mechanical work	
Electrical power systems	

Examination for external candidates

Programme subject	Provision
Automation systems	External candidates shall sit for a written examination in each programme subject. In addition to this, the external candidate shall sit for an interdisciplinary practical examination where the common programme subjects are included. The examination is prepared and graded locally.
Mechanical work	
Electrical power systems	

Trade Examination

Programme subject	Provision
Automation systems	All apprentices shall sit for an interdisciplinary written examination in the programme subjects. The examination must be passed before a trade examination can be taken. The examination is prepared centrally and censured locally.
Mechanical work	
Electrical power systems	

The provisions for assessment are stipulated in the regulations of the Norwegian Education Act.