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Laid down as a regulation by the Norwegian Directorate for Education and Training on 14 December 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.

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Utdanningsdirektoratet

## Purpose

Computer electronics technicians work with systems and equipment that are integrated into a number of areas of society from the entertainment and multimedia industries to telemedicine and satellite-based navigation. Electronic guidance and control systems have been finding increasing use and influence in society for safe and operational uses. Furthermore, proper functioning of computer and electronics systems has become very important for many business sectors and industries. Computer and electronics systems make interaction and communication with other people across geographical and social borders possible, and make work and trade more efficient in the global market. These high-technology systems demand computer electronics technicians who can combine a range of professional operations with objective specialisation in installation, operation and maintenance.

Computer electronics technicians shall develop the ability to work effectively and precisely. Practical training in the profession shall promote innovation, new ideas and solution-oriented thinking. It shall increase awareness of local, national and global environmental challenges related to better use of resources and sustainable development.

Learning in Computer electronics shall emphasise the structure, function and workings of different systems, devices and equipment. Knowledge of attitudes toward current rules and regulations shall be a central element of the subject. Learning in the subject shall emphasise protection of personal information security and ethics. Furthermore, learning in the subject shall promote electrical safety, working environment issues, quality assurance, customer service, interpersonal skills and business economy. Attitudes and skills necessary in order to work as a professional and perform good clean work shall also be central factors in the subject.

Gaining competence in system structures, system installations, system operations and system integration shall form the basis for learning about existing and future systems.

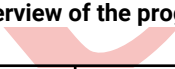
Training completed and passed in the subject will lead to a Trade Certificate. The professional title is Computer Electronics Technician.

## Structure

### Structure

Computer electronics consists of two programme subjects. The programme subjects complement each other, and should be viewed in relation to one another.

### Overview of the programme subjects:



Year level	Programme subjects	
Vg3	System and infrastructure	Devices and equipment

## Description of the programme subjects

The programme subject *System and infrastructure* covers knowledge of current rules, regulations and administration, and about planning, assembly, start-up, maintenance, troubleshooting, repairs and documentation of systems adapted and suited to business areas for computer and electronics companies. Integrated in the programme subject is customer service, assessment of profitability, data and information security, measuring and testing techniques, calculations, communication, quality assurance, electrical safety, working environment issues and the use of digital tools.

The programme subject *Devices and equipment* covers maintenance, troubleshooting and repairs of devices and equipment that contain basic solutions for electronic circuits and other devices and equipment suited and adapted to business areas for computer and electronics companies. Integrated in the subject is measuring and testing techniques, calculations, system troubleshooting, assessment of profitability, ethics, quality assurance, electrical safety, working environment issues, entrepreneurship and use of digital tools.

## Teaching hours

Teaching hours are given in 60-minute units.

Vg3

System and infrastructure 390 annual class hours

Devices and equipment 535 annual class hours

## Basic skills

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

*Being able to express oneself orally and in writing* in Computer electronics involves communicating clearly and precisely in professional conversations and discussions with clients, colleagues, suppliers, manufacturers and professionals from other disciplines.

*Being able to read* in Computer electronics involves understanding and interpreting Norwegian and English professional literature that is necessary to ensure professional updating, and which ensures that work is constantly being done in accordance with current regulations, directives and the needs of clients.

*Numeracy* in Computer electronics involves doing calculations for planning, systematic troubleshooting, assessment of measuring and testing results, cost estimates, assessment of profitability, documentation of finished work and interpretation of programs, systems and the workings of the different devices.

*Being able to use digital tools* in Computer electronics involves searching for information, communicating, installing, configuring and troubleshooting. Digital tools are also used to for programming, adjusting, documenting, planning, simulation and production of technical documentation for different systems and uses.

## Competence aims

*The aims of the studies are to enable pupils to*

- give an account of business areas where computer and electronics companies use systems and infrastructures
- plan, install, start-up operations, do functions tests, troubleshoot and document systems that belong to the business areas of the computer and electronics companies

- plan, install, configure, start-up operations, troubleshoot and document server and client-based data systems and networks
- select troubleshooting strategies, select instrument setups, estimate expected measurement values, measure electrical sizes and evaluate results from measurements and tests
- do risk assessments of finished work, control check results and evaluate the quality of own work
- use a professional and precise technical language when communicating with clients, suppliers, support personnel, colleagues and representatives from other disciplines and trades
- perform work in a professional and precise manner in accordance with current regulations, standards, guidelines and technical documentation from manufacturers in order to satisfy requirements for electronic communication, information and data security, electrical safety and personal safety
- carry out work in accordance with routines for internal and quality control
- give an account of the organisation and ownership structure of the company, and give an account of which factors may influence profitability in computer and electronics companies
- give an account of employee rights and obligations for computer and electronics companies based on current rules, regulations and systems of agreements between parties in a working environment
- give an account of how computer and electronics companies influence society locally, nationally and globally
- give an account of systems for authorisation and number and frequency administration
- document own training in System and infrastructure

*The aims of the studies are to enable pupils to*

- describe business areas for computer and electronics companies in Devices and equipment
- perform control checks, maintenance and repairs of devices and equipment that fall under the business area of computer and electronics companies
- select troubleshooting strategies, select instrument setups, estimate expected measurement values, measure electrical sizes and evaluate results from measurements and tests
- do risk assessments of finished work, control check results and evaluate the quality of own work
- use a professional and precise technical language when communicating with clients, suppliers, support personnel, colleagues and representatives from other disciplines and trades
- perform work in a professional and precise manner in accordance with current regulations, standards, guidelines and technical documentation from manufacturers in order to satisfy requirements for electronic communication, information and data security, electrical safety and personal safety
- carry out work in accordance with routines for internal and quality control
- guide and inform clients and evaluate profitability for clients and companies related to repair and servicing assignments

- discuss and elaborate on the environmental challenges of electronic waste and production of electronic devices and equipment
- evaluate and test out ideas for products and services with a thought to development, market demands and value creation
- document own training in Devices and equipment

## Assessment

### Vg3 Computer electronics technician

Provisions for final assessment:

#### *Overall achievement grades*

Programme subjects	Provision
System and infrastructure	The pupils shall have an overall achievement grade in each programme subject.
Devices and equipment	

#### *Examination for external candidates*

Programme subjects	Provision
System and infrastructure	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.
Devices and equipment	

#### *Craft examination*

Programme subjects	Provision
System and infrastructure	All pupils shall sit for an interdisciplinary written examination in each common programme subject. The examination must be passed before a Trade Certificate for completed apprenticeship can be taken. The examination is prepared and graded locally.
Devices and equipment	All pupils shall sit for a craft examination, which is normally carried out over a period of at least three working days.

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