

## **Industrial Technology - Curriculum for common programme subject in Vg2**

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

Laid down as a regulation by the Norwegian Directorate for Education and Training on 8 March 2007 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 01.08.2007

Valid to 31.07.2018



## **Purpose**

The programme area Industrial Technology shall lay the foundation for vocational practice in the mechanical, engineering, process and printing industries. This type of industry is characterized by continuous technological development with an increasing degree of automation and computerisation of work processes. The programme area shall help develop qualified personnel capable of adjusting to change. The subject shall promote a general understanding of production processes, environment, health and safety, and provide the basis for interdisciplinary thinking.

Teaching shall help give the pupil competence in industrial production and assembly, as well as the operation and maintenance of machines and technical equipment. Teaching shall also raise the pupil's understanding of the connection between mechanical design, regulation and control. The development of technical insight, practical skills, a sense of precision and order, and respect for safety are all central themes.

The studies shall pave the way for reflection, experience and command of skills through work assignments. The teaching shall prepare the pupil for work in branches and companies in which there is a constant need for developing technical skills. The studies shall provide the basis for working independently and with others and developing communication skills.

## **Structure**

The programme area for Industrial Technology consists of three programme subjects. The programme subjects complement each other, and should be viewed in relation to one another.

### **Overview of the programme subjects:**

<b>Year level</b>	<b>Programme subject</b>		
Vg2	Production	Repairs and maintenance	Documentation and quality

## **Description of the programme subjects**

### **Production**

The programme subject Production covers fabrication, joining materials, engineering work, industrial assembly, surface finishing and foundry work. The programme subject also deals with working with different materials, material properties, constructions and use of lifting gear. The programme subject covers work planning and the setting up, programming and operating

of machines and equipment. Guidelines for EHS are a key aspect of the subject.

## Repairs and maintenance

The programme subject deals with fault-finding, repairs, testing, assembly and preventive maintenance of machines and equipment. The programme subject involves working with hydraulic, pneumatic and electrical systems and ancillary control mechanisms. The programme subject also includes measuring techniques and measuring instruments.

## Documentation and quality

The programme subject covers the use of working drawings, schedules and digital tools. EHS assessments and quality assurance are key aspects in the programme subject and included in the planning, execution and documentation of assignments

## Teaching hours

Teaching hours are given in 60-minute units.

Vg2

Production 197 teaching hours per year

Repairs and maintenance 140 teaching hours per year

Documentation and quality 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 part of the subject competence. In Industrial Technology, basic skills are understood as follows:

*Being able to express oneself orally* in Industrial Technology involves participating in discussions concerning safety, choice of technical solutions and planning and implementing the work.

*Being able to express oneself in writing* in Industrial Technology involves producing plans, reports, measurement results and non-conformance reports.

*Being able to read* in Industrial Technology involves following manuals, instructions, relevant regulations, standards and EHS procedures. It also means being able to use drawings, work specifications, equipment manuals and product data sheets.

*Numeracy* in Industrial Technology means carrying out calculations related to programming, setting and calibrating machinery.

*Digital literacy* in Industrial Technology involves working with drawings and reports. It also means being able to program and troubleshoot different types of control and regulating systems.

## Competence aims

### Production

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

- work in line with EHS requirements set by the school and routines for keeping the workplace tidy and in order
- make plans for assignments and material requirements in accordance with work specifications
- prepare, set up, operate and monitor production machines and equipment
- choose materials for working up based on working drawings and specifications
- program and edit CNC programs for machines and equipment
- cut, saw, press, bend and shape materials in accordance with working drawings
- turn, mill and grind materials according to working drawings and instructions
- elaborate on different methods and processes for casting and shaping materials
- select a cutting tool and calibrate cutting data for manual and automatic machines according to drawings and instructions
- treat the surfaces of materials and elaborate on different methods and techniques
- choose and use methods for joining together materials according to instructions and work specifications
- elaborate on areas of use for and treatment of gases and chemicals relevant to the subject area

- assemble and modify simple constructions according to specifications
- elaborate on areas of use for and properties of steel, alloys, composites, paper and new types of material
- simulate and test materials and material properties
- carry out heat-treatment processes on components and materials in accordance with the assignment
- elaborate on electropotential series and the consequences of joining together different materials with respect to corrosion
- stop and hook lifts and give signals to the crane driver in accordance with relevant regulations

## Repairs and maintenance

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

- strip down, assemble, adjust and maintain machines and equipment according to specifications and in cooperation with others
- fabricate gaskets and use sealants according to specifications
- handle lubricants, chemicals and lubricating gear and elaborate on areas of use and properties
- locate and repair faults on production equipment and mechanical components
- install, commission and locate faults on relay controls
- commission and function-test programmable logic controls
- connect and locate faults on hydraulic and pneumatic systems using a schematic diagram
- choose and use manual tools and equipment for service, maintenance and repairs
- choose and use measuring methods in accordance with assignments and tolerances
- measure and evaluate pressure, temperature and volume in accordance with assignments

- connect to and disconnect from electrical systems with repair and maintenance work in accordance with relevant instructions and regulations

## Documentation and quality

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

- use technical drawings, diagrams and work specifications in planning, production and maintenance
- use digital tools to prepare 2- and 3-dimensional drawings
- explain the main principles in a quality assurance system
- carry out assignments in accordance with specific quality criteria and self-assess the work
- evaluate risk in an assignment in accordance with EHS regulations
- use product data sheets in work with equipment and chemicals
- register non-conformance, prepare non-conformance reports and propose corrective measures
- prepare reports and schedules relating to assignments and self-assess the work
- follow the school's rules for source separation and waste management

## Assessment

### Vg2 Industrial Technology

Provisions for final assessment:

#### **Overall achievement marks**

<b>Programme subject</b>	<b>Provisions</b>
Production Repairs and maintenance Documentation and quality	The pupil shall have an overall achievement mark in each programme subject.

### ***Examination for pupils***

<b>Programme subject</b>	<b>Provisions</b>
Production	The pupil shall take an interdisciplinary practical examination.  The examination is prepared and graded locally
Repairs and maintenance	
Documentation and quality	

### ***Examination for external candidates***

<b>Programme subject</b>	<b>Provisions</b>
Production	The external candidate shall take a written examination in each programme subject. The external candidate shall also take an interdisciplinary practical examination.
Repairs and maintenance	
Documentation and quality	The examination is prepared and graded locally

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