

Production equipment

The subject of production equipment covers industrial technological equipment, its application areas and applicable safety regulations. This also deals with how equipment is maintained and how its functions are checked and made more efficient.

Aim of the subject

Teaching in the subject of production equipment should aim at helping students develop the ability to use industrial technological production equipment, peripheral equipment, tools, machines and control technology equipment in accordance with applicable safety regulations. Teaching should give students the opportunity to develop knowledge of the different areas where equipment can be used, its construction and functions, and also about related methods and technologies.

Teaching should also give students the opportunity to develop their ability to connect and program control technology equipment. Teaching should give students the opportunity to develop their understanding of functions in simple control technology equipment, and also develop knowledge of symbols, descriptions of valves and labels.

Teaching should contribute to students developing knowledge to be able to carry out checks, fault tracing, efficiency increasing measures, and care of equipment. Teaching should also contribute to students developing knowledge of how quality systems are used, and also about the importance of quality assurance in production equipment. Students should be given the opportunity to develop knowledge of different materials, their properties, importance and their notation systems.

Teaching should give students the opportunity to carry out both theoretical and practical exercises to develop their ability to handle production equipment, peripheral equipment, tools, machines and control technology equipment.

Teaching in the subject of production equipment should give students the opportunities to develop the following:

- 1) The ability to plan, organise and carry out work in manual, and automated production and peripheral equipment in accordance with applicable safety regulations.
- 2) The ability to handle relevant data and computer equipment in the professional area.
- 3) The ability to carry out functional controls, measurements, calculations and fault tracing in production and peripheral equipment, tools, machines and control technology equipment.
- 4) The ability to make production equipment efficient and optimise installations.
- 5) The ability to maintain equipment, machines and tools, and also knowledge about the construction and function of equipment.
- 6) Knowledge of equipment symbols, descriptions and labels.

- 7) Knowledge of the properties of materials and their descriptions, and also the importance of materials in terms of function, quality, manufacturing and disposal.
- 8) The ability to measure, document and assess quality of completed work, and also use relevant concepts.

Courses in the subject

- Internal transport, 50 credits.
- Production equipment 1, 100 credits. The course can be studied several times with different contents.
- Production equipment 2, 100 credits, which builds on the course, production equipment 1. The course can be studied several times with different contents.
- Production equipment 3, 100 credits, which builds on the course, production equipment 2.
- Production equipment 4, 100 credits, which builds on the course, production equipment 3.
- Tools, 100 credits.

Internal transport

The course, internal transport, covers points 1, 3, 5–6 and 8 under the heading Aim of the subject.

Core content

Teaching in the course should cover the following core content:

- Operating transport equipment and handling goods.
- Transport equipment structure, working methods, stability and lifting capacity, and different terms.
- Application areas for transport equipment and relevant peripheral equipment.
- Environmental and safety regulations for handling various types of goods.
- Operating instructions, symbols and signal schedules relevant to the equipment.
- Functional control, supervision and daily maintenance of transport equipment and auxiliary equipment.
- Dimensioning and calculating the load that transport equipment and goods are subjected to during transport, storage and handling in accordance with e.g. load tables and applicable regulations.
- Simpler principles for freight handling, such as load balance, centre of gravity and risk factors.
- Simpler principles for logistics of internal transport, such as transport efficiency.

Knowledge requirements

Grade E

Students plan and organise transport tasks **in consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor transport methods and peripheral equipment, taking into account transport equipment and goods.

Students carry out with thoroughness and **in consultation** with the supervisor transport tasks in accordance with safety regulations, and also instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and safety regulations. In addition, students carry out **with some certainty** functional controls and load calculations. Students handle equipment and goods with **some** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment.

During the work, students identify problems that occur and remedy them **in consultation** with the supervisor.

Students give an account **in basic terms** of equipment, transport technologies and methods used for tasks, and also how these factors have affected the quality and function of goods. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise transport tasks **after consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor transport methods and peripheral equipment, taking into account transport equipment and goods.

Students carry out with thoroughness and **after consultation** with the supervisor transport tasks in accordance with safety regulations, instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and safety regulations. In addition, students carry out **with some certainty** functional controls and load calculations. Students handle equipment and goods with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor.

Students give an account **in detail** of equipment, transport technologies and methods used for tasks, and also how these factors have affected the quality and function of goods. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise transport tasks **after consultation** with the supervisor. In their planning, students interpret **with certainty** instructions, requirement specifications and safety regulations. **Students also anticipate difficulties that can occur, and adapt their planning and**

organisation to this. Furthermore, students choose **after consultation** with the supervisor transport methods and peripheral equipment, taking into account transport equipment and goods.

Students carry out with thoroughness and **after consultation** with the supervisor transport tasks in accordance with safety regulations, instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and safety regulations. In addition, students carry out **with certainty** functional controls and load calculations. Students handle equipment and goods with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor.

Students give an account **in detail and in a balanced way** of equipment, transport technologies and methods used for tasks, and also how these factors have affected the quality and function of goods. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.

Production equipment 1

The course, production equipment 1, covers points 1–3, 5–6 and 8 under the heading Aim of the subject. The course covers basic knowledge in the production equipment chosen.

Core content

Teaching in the course should cover the following core content:

- Simple handling and maintenance of selected production and peripheral equipment, e.g. tools, machines, production modules and control technology equipment in accordance with applicable safety regulations.
- Function and construction of simpler production and peripheral equipment.
- Basic production related tasks, such as bench work, simple work in machining, joining simple sheet metal products, use of measuring devices, and also reading and interpretation of simple drawings. Hot work.
- Daily maintenance of production and peripheral equipment.
- Relevant measurements, e.g. dimensioning, concentrations and tolerances, in connection with the use of equipment.
- Common areas of use, methods and techniques for relevant production and peripheral equipment.
- Common concepts, for relevant industrial technological production and peripheral equipment.
- Basic symbols, names and labels.

Knowledge requirements

Grade E

Students plan and organise tasks related to production and peripheral equipment **in consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **in consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, and also specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** relevant measurements. Students handle materials, equipment, tools and machines with **some** skills and

keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **in consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in basic terms** of materials, techniques, methods and tools used for tasks and how these factors have influenced quality and final results. Students also give an account **in basic terms** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** relevant measurements. Students handle materials, equipment, tools and machines with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in detail** of materials, techniques, methods and tools used for tasks and how these factors have influenced quality and final results. Students give an account **in detail** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with certainty** instructions, requirement specifications and safety regulations. **Students also anticipate difficulties that can occur, and adapt their planning and organisation to this.** Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and manufacturing guidelines. In addition, students carry out **with certainty** relevant measurements. Students handle materials, equipment, tools and machines with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in detail and in a balanced way** of materials, techniques, methods and tools used for tasks and how these factors have influenced quality and final results. Students give an account **in detail and in a balanced way** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.

Production equipment 2

The course, production equipment 2, covers points 1, 3, and 5–8 under the heading Aim of the subject. The course covers basic knowledge in the production equipment chosen.

Core content

Teaching in the course should cover the following core content:

- Work with and maintenance of selected production and peripheral equipment, e.g. tools, machines, production modules and control technology equipment in accordance with applicable safety regulations.
- Function and construction of relevant production and peripheral equipment.
- Simpler functional controls and measurements, and also some maintenance of production and peripheral equipment.
- Simple dimensioning and technical calculations.
- Application areas for relevant production and peripheral equipment.
- Simple concepts, methods and techniques for production and peripheral equipment in industrial technological production.
- Simple technical descriptions of production and peripheral equipment.
- Properties of materials and the importance of materials in terms of function and quality in production and peripheral equipment, and also products.
- Measurement and documentation of quality of tasks carried out.

Knowledge requirements

Grade E

Students plan and organise tasks related to production and peripheral equipment **in consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **in consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, and also specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional controls, measurements, simpler dimensioning and calculations. Students handle materials, equipment, tools and machines with **some** skills and keep the workplace well-organised. Students

work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **in consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. When the task has been completed, students draw up **simple** documentation of the work process and their results.

Students give an account **in basic terms** of the material used, its properties, and also the technology, methods and tools used in tasks. Students also give an account of how these factors in the work process have affected quality and final results. Students give an account **in basic terms** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional controls, measurements, simpler dimensioning and calculations. Students handle materials, equipment, tools and machines with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate** documentation of the work process and results.

Students give an account **in detail** of the material used, its properties, and also of technology, methods and tools used in the task. Students also give an account of how these factors in the work process have affected quality and final results. Students give an account **in detail** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with certainty** instructions, requirement specifications and safety regulations. **Students also anticipate difficulties that can occur, and adapt their planning and organisation to this.** Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and manufacturing guidelines. In addition, students carry out **with certainty** functional controls, measurements, simpler dimensioning and calculations. Students handle materials, equipment, tools and machines with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate and detailed** documentation of the work process and results.

Students give an account **in detail and in a balanced way** of the material used, its properties, and also of technology, methods and tools used in the task. Students also give an account of how these factors in the work process have affected quality and final results. Students give an account **in detail and in a balanced way** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.

Production equipment 3

The course, production equipment 3, covers points 1, 3 and 5–8 under the heading Aim of the subject. The course covers advanced knowledge in the subject.

Core content

Teaching in the course should cover the following core content:

- Work with and care of production and peripheral equipment, e.g. tools, machines, production modules and control technology equipment in accordance with applicable safety regulations.
- Function and construction of production and peripheral equipment.
- Functional controls and measurement of production and peripheral equipment.
- Dimensioning and technical calculations.
- Application areas for relevant production and peripheral equipment.
- Concepts, methods and technologies used in production and peripheral equipment.
- Technical descriptions of production and peripheral equipment.
- Properties of materials, systems for classifying materials and the importance of materials for function and quality, and also manufacturing of production and peripheral equipment and products.
- Measurement, documentation and assessment of the quality of work carried out.

Knowledge requirements

Grade E

Students plan and organise tasks related to production and peripheral equipment **in consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **in consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, and also specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional controls, measurements, dimensioning and calculations. Students handle materials, equipment, tools and machines with **some** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the

environment. During the work, students identify problems that occur and remedy them **in consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. When the task has been completed, students draw up **simple** documentation of the work process and their results.

Students give an account **in basic terms** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in basic terms** of how these factors in the work process have affected quality and final results. Students give an account **in basic terms** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional controls, measurements, dimensioning and calculations. Students handle materials, equipment, tools and machines with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate** documentation of the work process and results.

Students give an account **in detail** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in detail** of how these factors in the work process have affected quality and final results. Students give an account **in detail** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with certainty** instructions, requirement specifications and safety regulations. **Students also anticipate difficulties that can occur, and adapt their planning and organisation to this.** Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and manufacturing guidelines. In addition, students carry out **with certainty** functional controls, measurements, dimensioning and calculations. Students handle materials, equipment, tools and machines with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate and detailed** documentation of the work process and results.

Students give an account **in detail and in a balanced way** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in detail and in a balanced way** of how these factors in the work process have affected quality and final results. Students give an account **in detail and in a balanced way** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.

Production equipment 4

The course, production equipment 4, covers points 1 and 3–8 under the heading Aim of the subject. The course covers advanced skills and knowledge.

Core content

Teaching in the course should cover the following core content:

- Advanced handling, care and use of production and peripheral equipment, e.g. tools, machines, production modules and control technology equipment in accordance with applicable safety regulations.
- Function and construction of advanced production and peripheral equipment.
- Functional controls, measurement, assessment of measuring errors in production and peripheral equipment.
- Dimensioning and technical and financial calculations.
- Optimising and increasing efficiency of production and peripheral equipment.
- Application areas for production equipment and peripherals.
- Advanced concepts, methods and technologies for production and peripheral equipment.
- Advanced technical descriptions of production and peripheral equipment.
- Properties of materials, systems for classifying materials and the importance of materials for function and quality, and also manufacturing and destruction of production and peripheral equipment and products.
- Measurement, documentation and assessment of the quality of work carried out.

Knowledge requirements

Grade E

Students plan and organise tasks related to production, and peripheral equipment **in consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **in consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, and also specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional

controls, measurements, assessments of measurement errors, dimensioning and technical and financial calculations. Students handle materials, equipment, tools and machines with **some** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **in consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. When the task has been completed, students draw up **simple** documentation of the work process and their results.

Students give an account **in basic terms** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in basic terms** of how these factors in the work process have affected quality and final results. In addition, students give an account **in basic terms** of the ways in which properties of materials affect their disposal. Students give an account **in basic terms** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** functional controls, measurements, assessments of measurement errors, dimensioning and technical and financial calculations. Students handle materials, equipment, tools and machines with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate** documentation of the work process and results.

Students give an account **in detail** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in basic**

terms of how these factors in the work process have affected quality and final results. In addition, students give an account **in detail** of the ways in which properties of materials affect their disposal. Students give an account **in detail** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise tasks related to production and peripheral equipment **after consultation** with the supervisor. In their planning, students interpret **with certainty** instructions, requirement specifications and safety regulations. **Students also anticipate difficulties that can occur, and adapt their planning and organisation to this.** Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to production and peripheral equipment in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and manufacturing guidelines. In addition, students carry out **with certainty** functional controls, measurements, assessments of measurement errors, fault tracing, dimensioning, and technical and financial calculations. Students handle materials, equipment, tools and machines with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with certainty** equipment, machines and tools in accordance with instructions. After the task has been completed, students draw up **accurate and detailed** documentation of the work process and results.

Students give an account **in detail and in a balanced way** of the material used, its properties and classification system, and also of technology, methods and tools used in the task. Students also give an account **in detail and in a balanced way** of how these factors in the work process have affected quality and final results. In addition, students give an account **in detail** of the ways in which properties of materials affect their disposal. Students give an account **in detail and in a balanced way** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.

Tools

The course, tools, covers points 1, 3, 5 and 7–8 under the heading Aim of the subject.

Core content

Teaching in the course should cover the following core content:

- Handling, care and use of tools, machines and equipment for manufacturing tools such as casting, pressing, cutting, bending, tensioning and assembling.
- Function and construction of tools, machines and equipment for manufacturing tools e.g. casting, pressing, cutting, bending, tensioning and assembling.
- Standard components in manufacturing of tools.
- Special data for tool manufacturing.
- Pilot production and quality control.
- Heat treatment of material for tools.
- Properties of materials in production equipment used to manufacture tools.
- Properties of materials and the importance of materials for function and quality of tool manufacturing.

Knowledge requirements

Grade E

Students plan and organise **in consultation** with the supervisor, tasks involving tools, machines and equipment for manufacturing tools. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **in consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **in consultation** with the supervisor tasks related to tools, machines and equipment for manufacturing tools in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** measurements, calculations and quality control. Students handle materials, equipment, tools and machines with **some** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **in consultation** with the

supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in basic terms** of the material used, its properties, and also the technology, methods and tools used in tasks. Students also give an account **in basic terms** of how these factors in the work process have affected quality and final results. Students give an account **in basic terms** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **simple** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

Grade C

Students plan and organise **after consultation** with the supervisor, tasks involving tools, machines and equipment for manufacturing tools. In their planning, students interpret **with some certainty** instructions, requirement specifications and safety regulations. Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to tools, machines and equipment for manufacturing tools in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **satisfactory** in relation to specific quality requirements. In their work, students use **with some certainty** instructions and manufacturing guidelines. In addition, students carry out **with some certainty** measurements, calculations and quality control. Students handle materials, equipment, tools and machines with **good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with some certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in detail** of the material used, its properties, and also of technology, methods and tools used in the task. Students also give an account **in basic terms** of how these factors in the work process have affected quality and final results. Students give an account **in detail** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments.

Students use **with some certainty** correct professional language.

In consultation with the supervisor, students assess **with some certainty** their own ability and the requirements of the situation.

Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

Grade A

Students plan and organise **after consultation** with the supervisor, tasks involving tools, machines and equipment for manufacturing tools. In their planning, students interpret **with certainty** instructions and manufacturing guidelines. **Students also anticipate difficulties that can occur, and adapt their planning and organisation to this.** Furthermore, students choose **after consultation** with the supervisor working methods, tools, equipment and materials suitable for the task.

Students carry out with thoroughness and **after consultation** with the supervisor tasks related to tools, machines and equipment for manufacturing tools in accordance with safety regulations, specific instructions and requirement specifications. The results of the work are **good** in relation to specific quality requirements. In their work, students use **with certainty** instructions and manufacturing guidelines. In addition, students carry out **with certainty** measurements, calculations and functional controls. Students handle materials, equipment, tools and machines with **very good** skills and keep the workplace well-organised. Students work ergonomically in a way which is safe both for themselves and others, and with due regard to the environment. During the work, students identify problems that occur and remedy them **after consultation** with the supervisor. In addition, students maintain **with certainty** equipment, machines and tools in accordance with instructions.

Students give an account **in detail and in a balanced way** of the material used, its properties, and also of technology, methods and tools used in the task. Students also give an account **in detail and in a balanced way** of how these factors in the work process have affected quality and final results. Students give an account **in detail and in a balanced way** of possible deviations from specifications, and also their own work. In addition, students evaluate their work and results in **balanced** assessments, **and also make proposals on how the work can be improved.**

Students use **with certainty** correct professional language.

In consultation with the supervisor, students assess **with certainty** their own ability and the requirements of the situation.