

Production knowledge

The subject of production knowledge covers how production ideas are developed and what must be taken into account in this process. The subject covers how the design and quality of products affect production planning and organisation or the adaptation of production processes, and also different areas of responsibility, maintenance needs and logistics. The subject also covers the importance of communication, co-operation and customer oriented ways of thinking.

Aim of the subject

Teaching in the subject of production knowledge should aim at students developing an overall understanding of production processes. Teaching should give students the opportunity to develop knowledge of work processes involving the development of a production idea into a final product. Teaching should contribute to students developing knowledge about the effects of development on the design and quality of products, and also how this in its turn affects the choice of materials and production methods. Teaching should give students the opportunity to develop knowledge of production flows, maintenance and alternative production technologies. Students should also be given the opportunity to develop knowledge of different tasks and areas of responsibility in industrial technological production.

Students should be given the opportunity to develop knowledge about why logistics, efficiency, production costs, marketing and work for sustainable development are important for industrial technological production. In addition, students should be given the opportunity to develop knowledge of customer oriented manufacturing. Teaching should also give students the opportunity of developing communication and cooperation skills, and also understanding of why this is important for production.

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

- 1) Knowledge of how production ideas are developed.
- 2) Knowledge of organisational units, tasks and areas of responsibility in industrial technological production.
- 3) Knowledge of how development through design and quality affects production.
- 4) Knowledge of choice of materials, production methods, production flows, maintenance and alternative production technologies.
- 5) Knowledge of the importance of cooperation for production and companies.
- 6) Knowledge of logistics, efficiency, production, marketing and sustainable development.
- 7) Knowledge of customer steered manufacturing.
- 8) The ability to use concepts and expressions relevant to the subject area.

Courses in the subject

- Production knowledge 1, 100 credits.
- Production knowledge 2, 100 credits, which builds on the course, production knowledge 1.

Production knowledge 1

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

Core content

Teaching in the course should cover the following core content:

- The process of how a production idea affects e.g. the design, function and quality of a product. How changes, e.g. design, function and quality affect existing production.
- Different organisational units, their cooperation and how they make up a whole and create context in industrial technological production.
- Tasks and areas of responsibility in technological production departments, and the functions they fulfil in companies.
- Choice of materials, methods and techniques for both production in terms of operating reliability and maintenance for ongoing production flow and sustainable development.
- Logistics in industrial technological production, e.g. order processing, purchases of raw materials, production planning, personnel issues, sales, marketing and stocks.
- Production costs e.g. what income and costs exist for production.
- Impact of demand on production.
- Importance of cooperation for effective and profitable manufacturing.
- Concepts and expressions relevant to the subject area.

Knowledge requirements

Grade E

Students give an account **in basic terms** of how a production idea affects production. In addition, students explain **in basic terms** how different organisational units in companies are related, and also their different tasks and areas of responsibility. In addition, students reason **in basic terms** about the relationship between design work, product development and quality work. Students also reason **in basic terms** about the relationship between choice of material, choice of production technology and maintenance, and about how these choices affect production flow and sustainable development.

Students give an account **in basic terms**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in basic terms** logistics in a production unit and how it affects production costs.

Students use **with some certainty** correct professional language in their reports and reasoning.

Grade D

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

Grade C

Students give an account **in detail** of how a production idea affects production. In their reports, students explain **in basic terms** how different organisational units in companies are related, and also their different tasks and areas of responsibility. In addition, students reason **in detail** about the relationship between design work, product development and quality work. Students also reason **in detail** about the relationship between choice of material, choice of production technology and maintenance, and about how these choices affect production flow and sustainable development.

Students give an account **in detail**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in detail** logistics in a production unit and how it affects production costs.

Students use **with some certainty** correct professional language in their reports and reasoning.

Grade B

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

Grade A

Students give an account **in detail and in a balanced way** of how a production idea affects production. In their reports, students explain **in detail and in a balanced way** how different organisational units in companies are related, and also their different tasks and areas of responsibility. In addition, students reason **in detail and in a balanced way** about the relationship between design work, product development and quality work. Students also reason **in detail and in a balanced way** about the relationship between choice of material, choice of production technology and maintenance, and about how these choices affect production flow and sustainable development.

Students give an account **in detail and in a balanced way**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in detail and in a balanced way** logistics in a production unit and how it affects production costs.

Students use **with certainty** correct professional language in their reports and reasoning.

Production knowledge 2

The course, production knowledge 2, covers points 1–8 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:

- The process of how a production idea affects e.g. the design, function and quality of a product. How changes, e.g. design, function and quality affect existing production.
- Different organisational units, their cooperation and how they make up a whole and create context in industrial technological production.
- Tasks and areas of responsibility in industrial technological production, and the functions they fulfil in companies. Developing a work organisations in order to support company development and production.
- Innovation and development of production through systematic design and quality measures.
- Importance of choice of materials, methods and technologies for both production, operating reliability, and preventative and remedial maintenance for effective production flows, good production economy and sustainable development.
- Alternative production technologies for customer adaptation.
- Making production effective, e.g. lean production.
- Logistics in industrial technological production for effective functionality in manufacturing and companies with sustainable development.
- How fixed, variable, direct and indirect costs affect production.
- Importance of marketing for a company's financial position.
- Producing what customers want through customer steered manufacturing.
- Importance of cooperation for organisations and companies.
- Concepts and expressions relevant to the subject area.

Knowledge requirements

Grade E

Students give an account **in basic terms** of how a production idea affects existing production and the development of new production lines. In their reports, students describe **in basic terms** how a

production idea is developed, and also the process of development into a final product and its production. In addition, students explain **in basic terms** how different organisational units in companies are related, and also give an account **in basic terms** of their different tasks and areas of responsibility. Students also give an account **in basic terms** of how work organisations can be designed to become a support for companies' development and production. Students also reason **in basic terms** about the relationship between design, product development and systematic quality work. In addition, students give an account **in basic terms** of how product development and preventative maintenance affect production flow and sustainable development. Students also reason **in basic terms** about alternative production technologies for making production more effective. In addition, students carry out **with some certainty** simple production costing calculations.

Students give an account **in basic terms** of how work organisations can be designed for effective and profitable manufacturing, and also **in basic terms**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in basic terms** logistics for industrial technological production, and also give an account **in basic terms** of production controlled and customer steered manufacturing.

Students use **with some certainty** correct professional language in their reports and reasoning.

Grade D

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

Grade C

Students give an account **in detail** of how a production idea affects existing production and the development of new production lines. In their reports, students describe **in detail** how a production idea is developed, and also the process of development into a final product and its production. In addition, students explain **in detail** how different organisational units in companies are related, and also give an account **in detail** of their different tasks and areas of responsibility. Students also give an account **in detail** of how work organisations can be designed to become a support for companies' development and production. Students also reason **in detail** about the relationship between design, product development and systematic quality work. In addition, students give an account **in detail** of how product development and preventative maintenance affect production flow and sustainable development. Students also reason **in detail** about alternative production technologies for making production more effective. In addition, students carry out **with some certainty** simple production costing calculations.

Students give an account **in detail** of how work organisations can be designed for effective and profitable manufacturing, and also **in detail**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in detail** the logistics for industrial technological production, and also give an account **in detail** of production controlled and customer steered manufacturing.

Students use **with some certainty** correct professional language in their reports, descriptions and reasoning.

Grade B

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

Grade A

Students give an account **in detail and in a balanced way** of how a production idea affects existing production and the development of new production lines. In their reports, students describe **in detail and in a balanced way** how a production idea is developed, and also the process of development into a final product and its production. In addition, students explain **in detail and in a balanced way** how different organisational units in companies are related, and also give an account **in detail and in a balanced way** of their different tasks and areas of responsibility. Students also give an account **in detail and in a balanced way** of how work organisations can be designed to become a support for companies' development and production. Students also reason **in detail and in a balanced way** about the relationship between design, product development and systematic quality work. In addition, students give an account **in detail and in a balanced way** of how product development and preventive maintenance affect the flow of production and sustainable development. Students also reason **in detail and in a balanced way** about alternative production technologies for making production more effective. In addition, students carry out **with certainty** simple production costing calculations.

Students give an account **in detail and in a balanced way** of how work organisations can be designed for effective and profitable manufacturing, and also **in detail and in a balanced way**, based on examples, of the importance of cooperation for effective and profitable manufacturing. In addition, students describe **in detail and in a balanced way** logistics for industrial technological production, and also give an account **in detail and in a balanced way** of production controlled and customer steered manufacturing.

Students use **with certainty** correct professional language in their reports, descriptions and reasoning.