



Curriculum for the Academy Profession Degree Programme in production (Production Technology)

August 2019

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1. Curriculum framework

This curriculum is a translated version of the Danish curriculum. In case of discrepancies, the rules in the Danish curriculum apply.

The purpose of the programme is to qualify students to independently plan, organise and carry out tasks in the field of development and construction of products, machines, operational solutions, industrial production, as well as technical sales and procurement in companies primarily within the industry.

This full-time programme is rated at 120 ECTS points. The academy profession programme is a level 5 in the qualifications framework for lifelong learning in accordance with the qualifications framework for higher education.

The Academy Profession Degree Programme in production gives the graduate the right to use the title AP graduate in Production Technology. The English title is AP Graduate in Production Technology.

The title of the programme is Academy Profession Degree Programme in Production Technology.

The following acts and ministerial orders apply to the programme:

Danish (Consolidated) Act on Academies of Professional Higher Education

Danish (Consolidated) Act on Academy Profession Programmes and Professional Bachelor Programmes

Ministerial Order on Technical and Commercial Academy Profession Programmes and Professional Bachelor Programmes

Ministerial Order on Examinations on Professionally Oriented Higher Education Programmes (the examination order)

Ministerial Order on Admission to and Enrolment on Academy Profession Programmes and Professional Bachelor Programmes (the Admissions Order)

Ministerial Order on the Grading Scale and Other Forms of Assessment of Study Programmes Offered under the Ministry of Higher Education and Science

National part/local part of the curriculum

The curriculum consists of a national part, adopted by the Academies of Professional Higher Education's educational network for the programme and an institutional part established by the individual educational institution.

The national part was approved by the programme network of the Profession Academies in August 2019.

This curriculum will be effective from August 2019 and apply to all students starting their studies after this date.

1.1. Transitional arrangements

Students enrolled under the rules of the previous curriculum must complete their studies in accordance with the rules of this curriculum with the exception of the rules for withdrawal of exam deregistration. Withdrawal of exam registration will be in accordance with section 5 (1), which states that withdrawal from an exam can only be allowed in case of documented illness or maternity/paternity leave.

1.2. The programme's intended learning outcome:

Knowledge

The graduate must have gained:

- Development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:
 - Companies' use of technical, organisational, financial, quality and environmental theories and methods in production, product development and technical sales and procurement, and
 - Technical, organisational, financial, quality and environmental concepts and methods and companies' use of these concepts and methods in production, product development and technical sales and procurement, and
 - Globalisation and international development trends.

Skills

The graduate must be able to:

- Apply the key methods and tools of the subject area as well as use the skills listed below:
 - technical, innovative, creative and analytical skills related to employment in production, product development and technical sales and procurement
- Assess practice-oriented issues and draw up and choose appropriate solutions to aspects of a technical, organisational, financial, quality and environmental nature
- Communicate practice-oriented problems and solutions to partners and users—i.e. communicating technical, organisational, financial, quality and environmental issues and solutions by means of technical documentation and calculation.

Competencies

The graduate must be able to:

- Handle situations of a development-oriented nature within production, product development and technical sales and procurement
- Take part in project management of professional and interdisciplinary collaboration within production, product development, procurement and sales, nationally and internationally

- Acquire skills and new knowledge in relation to production, product development and technical sales and procurement in a structured context.

2. Admission

Admission is in accordance with the Ministerial Order on Admission to and Enrolment on Academy Profession Programmes and Professional Bachelor Programmes.

3. National and local programme elements

3.1. Sequencing of programme elements, internship and exams

Programme structure				
Programme elements	National programme elements	Local programme elements		
	year of study (first and second semester)	Third semester		Fourth semester
Product development 10 ECTS	10			
Construction 10 ECTS	10			
Technical documentation 6 ECTS	6			
Materials and manufacturing processes 9 ECTS	9			
Business technology 11 ECTS	11			
Production engineering 8 ECTS	8			
Automation 6 ECTS	6			
Local programme elements 25 ECTS Electives 5 ECTS			30	
Internship 15 ECTS				15
Final project				15

15 ECTS				
ECTS points in total: 120 ECTS	60		30	30

3.2. The programme contains seven national programme elements

3.2.1. Product development

Content

This programme element covers planning and execution of the product development, processes and associated services and methods.

Intended learning outcomes of Product development

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Systematic development of product, processes and services
- Idea generation
- Needs analysis performance
- Understanding of market and business principles, including knowledge gathering and data processing
- Aesthetics and design
- Visualisation
- Problem statement and requirement specification

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Outlining product and process
- Performing a functional analysis

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Knowledge and understanding of markets and needs
- Stakeholder and user perspectives

The student must be able to communicate practice-oriented issues and solutions to partners and users, including:

- Listing and selecting ideas by way of concept proposals
- Communicating relevant results of their own work

Competencies

The student must be able to manage development-oriented situations, including:

- Participation in development and ideation processes in a systematic product development process while taking into account other subject fields in the study programme

The student must be able to contribute to and actively participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Cross-disciplinary teamwork on the development of products and services

The student must be able to acquire and apply new knowledge, skills and competencies within the profession in a structured context, including:

- New relevant knowledge in the development of products and services

Number of ECTS points

The programme element Product development is worth 10 ECTS points.

3.2.2. Construction

Content

This programme element covers dimensioning and construction of a physical product based on the identified specifications and load conditions with due consideration to the interaction with the other programme elements having an impact on the entire construction.

Intended learning outcomes of Construction

Knowledge

The student must have gained development-based knowledge of the practice of the profession and centrally applied theory and methods, including:

- Statics and the science of the strength of materials
- Dimensioning of constructions
- Commonly used machine elements and concepts
- 3D models and basic FEM analysis (Finite Element Method)
- Risk analysis

The student must be able to understand practice and key theories and methods as well as the profession's use of theories and methods, including

- Product dimensioning and coherence with other decision-making in a development process
- Tolerancing and its impact on manufacturing processes, price and application of a product.

Skills

The student must be able to apply the key methodologies and tools of the subject area as well as the skills related to employment in the industry, including:

- Calculation of estimates on statically determinate constructions
- Identification of the various forms of tension that arise in a load-bearing construction
- Identification of critical points in a construction, calculation of strength and subsequently dimensioning of a construction

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Demonstration of a practical understanding of the design of physical products in relation to their capacity in terms of strength
- Incorporation of standard solutions in construction design
- Calculation and determination of relevant tolerances for a given construction

The student must be able to communicate practice-oriented issues and solutions to partners and users, including:

- Explanation of their dimensioning and construction solutions in a structured manner
- Application of commonly used IT tools for the acquisition of knowledge, data processing, documentation and presentation

Competencies

The student must be able to:

Manage development-oriented situations, including:

- Incorporation of inputs from and outputs into the other subject areas in their work, taking into account in particular:
 - Choice of material
 - Producibility
 - Assembly
 - Function

Participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Engaging in interdisciplinary collaboration on the dimensioning of simple statically specific constructions

Acquire new knowledge, skills and competencies within the profession in a structured context.

Number of ECTS points

The programme element Construction is worth 10 ECTS points.

3.2.3. Technical documentation

Content

The programme element covers technical documentation with correct approval criteria in accordance with current norms and standards.

Intended learning outcomes of Technical documentation:

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods, including:

- Structure and coherence in building a 3D model
- Types of technical drawing and hierarchy in relation to subsequent application

The student must be able to understand practice and key theories and methods as well as the profession's use of theories and methods, including

- Current standards and directives
 - Technical drawing, line weight, layout of views and drawing layout
 - CE Marking
 - Common file standards for export in CAM (Computer-Aided Manufacturing)
- The complete technical dossier, its structure, purpose and content
 - The importance of technical types of documentation in a global and legal context
 - The technical drawing as a means of communication

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Use of 3D CAD (Computer-Aided Design) software in the construction of a 3D CAD model at part as well as assembly level
- Use of 3D CAD software in the preparation of technical production drawings in accordance with current norms and standards as well as subsequent application
- Preparation of illustrations based on 3D models and prototypes

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Application and assessment of commonly used IT tools for the acquisition of knowledge, data processing, documentation and presentation

The student must be able to communicate practice-oriented issues and solutions to partners and users, including:

- 3D CAD model conversion of sketches, concept descriptions and design calculations

Competencies

The student must be able to manage development-oriented situations, including:

- Use of relevant software solutions for technical documentation
- Use of relevant standards and norms for the purpose of documentation in complex contexts

The student must be able to participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Attention to and management of substantial parts of the technical documentation in an interdisciplinary development process while taking into consideration input and output from the other core areas

The student must be able to acquire new knowledge, skills and competencies within the profession in a structured context, including:

- 3D Modelling and documentation standards

Number of ECTS points

The programme element Technical documentation is worth 6 ECTS points.

3.2.4. Materials and manufacturing processes

Content

This programme element is about the prerequisites for qualified selection of materials and manufacturing processes based on professional and interdisciplinary parameters.

Intended learning outcomes of Materials and manufacturing processes

Knowledge

The student must have gained development-based knowledge of the practice of the profession and centrally applied theory and methods, including:

- Physical properties of and suitable manufacturing processes for:
 - Metals, particularly steel and aluminium
 - Plastic, elastomers and composites
 - Wood
 - Ceramics
 - New materials
- Surface and heat treatment of various materials
- Joining technologies
- Machining processes
- Choice of materials in a sustainability perspective
- Materials testing

The student must be able to understand practice and key theories and methods as well as the profession's use of theories and methods, including

- Material properties and their implications in a product development process
- Manufacturing processes and their implications in terms of quality and price of the final product

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Use of databases/reference works for the provision of data on materials, including
 - Physical properties
 - Manufacturing processes
 - Environment/sustainability

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Selection of materials based on their properties and design requirements
- Identification, assessment and recommendation of suitable manufacturing processes
- Identification of relevant material properties in relation to the function of a product and subsequent assessment and selection of suitable materials.
- Assessment of the relationship between materials, manufacturing processes and sustainability
- Assessment of materials and manufacturing process in an environmental perspective
- Recommendation of manufacturing processes based on realisability

The student must be able to communicate practice-oriented issues and solutions in relation to materials and manufacturing processes to partners and users.

Competencies

The student must be able to manage development-oriented situations, including:

- Contributing to the choice of materials and manufacturing processes based on a holistic understanding of a realisable development of the product/service

The student must be able to participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Interdisciplinary collaboration on the selection of materials and manufacturing processes while taking into account the framework provided by the other core areas

The student must be able to acquire new knowledge, skills and competencies, in a structured context, in relation to material properties and manufacturing processes

Number of ECTS points

The programme element Material and manufacturing processes is worth 9 ECTS credits.

3.2.5. Production engineering

Content

This programme element is about production engineering in terms of preparation, planning and the use of a company's production assets.

Intended learning outcomes of Production engineering

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Manufacturing and production processes
- Principles in production engineering, including:
 - Production layout
 - Process and product flows
- Basis of production, including data processing
- Stock building and management
- Lead-time in production engineering
- Control measurement methods
- Allocation of resources
- Costs
- Physical work environment in the production process

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Preparation of the production of a product taking into account the company's other systems, cost price and given production layout

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Comparing alternative solutions in terms of costs and resource consumption
- Converting the basis of construction into the basis of production
- Preparing production plans on the basis of production and using methodical planning tools

The student must be able to communicate practice-oriented issues and solutions to partners and users, including:

- Presentation of their solutions and results in a practice-oriented context

Competencies

The student must be able to manage development-oriented situations, including:

- Preparation of the production of a given product;
- Application of commonly used IT tools for the acquisition of knowledge, data processing and documentation

The student must be able to participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Actively incorporating elements from the other programme elements, in particular business techniques, in production preparation
- Contributing to the planning of the production of a given product
- Taking part in interdisciplinary dialogue on product and production optimisation.

The student must be able to acquire new knowledge, skills and competencies, in a structured context, in relation to production technical work.

Number of ECTS points

The programme element Production engineering is worth 8 ECTS points.

3.2.6. Automation

Content

This programme element covers the use of automation in own solutions in product construction and production planning in a given company.

Intended learning outcomes of Automation

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods, including:

- Control terminology, theories and methods used in automation
- Future production methods in the light of digitisation
- Item structure in relation to automated production

The student must be able to understand practice and key theories and methods as well as the profession's use of theories and methods, including

- Use of pneumatics and hydraulics
- Commonly used electronic control solutions
- Mechanical components applied in pneumatics and hydraulics
- Building a simple control circuit

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Preparation of a design specification for use in the development of simple automated solutions in a production process

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Product improvements that render it suitable for automated production

- Drawing on company and stakeholder data material in the configuration of future production solutions
- Making allowance for later automatic production of a given item or product in the construction design
- Applying commonly used IT tools for the acquisition of knowledge, data processing and documentation
- Estimating the potential of automation based on a systems perspective of production facilities, taking into account the profitability, quality and safety of the entire production system

The student must be able to communicate practice-oriented issues and solutions in relation to automation, to partners and users.

Competencies

The student must be able to manage development-oriented situations, including:

- Qualification of automation possibilities, together with other groups of professionals, based on an overall view of the company's products and manufacturing process

The student must be able to participate in academic and interdisciplinary cooperation based on a professional approach, including:

- In a work-related context, contributing to the development of automated solutions in a given company's work with products and/or production optimisation

The student must be able to acquire new knowledge, skills and competencies, in a structured context, in relation to production automation.

Number of ECTS points

The programme element Automation is worth 6 ECTS points.

3.2.7. Business technology

Content

This programme element is about understanding and working with a company's management systems, including payroll, stock, production, finance, quality and environmental systems as well as its organisation.

Intended learning outcomes of Business technology

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Project management
- Business economics
- Production and stock management systems

- Quality management systems
- Business organisation
- Environment, occupational health and safety and current legislation
- Technical sales and procurement
- Internationalisation

Skills

The student must be able to apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Coordinating a development project
- Using the financial aspect as a significant factor when deciding on own solutions, including
 - Assessing the impact on income and expenditure account and balance sheet
 - Contributing to the drawing up of calculations
 - Drawing up and assessment of budgets

The student must be able to assess practice-oriented issues and suggest and select possible solutions, including:

- Processing and assessing statistical data in connection with quality measurements
- Preparing instructions and procedures for quality control systems
- Establishing a comprehensive overview of the production and management systems of a company
- Applying commonly used IT tools for the acquisition of knowledge, data processing and documentation

The student must be able to communicate practice-oriented issues and solutions to partners and users, including:

- Communication of issues and possible solutions through graphically illustrated material and information flow in a company

Competencies

The student must be able to manage development-oriented situations, including:

- Qualifying the company's data base in terms of quality, finances and resources
- Developing business processes, including procedures and instructions for the company's production and management systems
- Conducting optimisation processes

The student must be able to participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Technical sales and procurement
- Contribution to the preparation of a company business plan based on their own professional expertise

- Interdisciplinary cooperation with the other subject areas on company management and planning

The student must be able to acquire new knowledge, skills and competencies, in a structured context, in relation to the programme element.

Number of ECTS points

The programme element Business technology is worth 11 ECTS points.

3.3. Number of exams in the national programme elements

The national programme elements of the first year of study make out 60 ECTS and complete with 1 (one) exam.

There is an additional exam in the final exam project. For the number of internship exams, see [section 3](#).

For a comprehensive overview of all exams in the programme, see the institutional part of the curriculum. The national programme elements described in this curriculum can be examined together with programme elements laid down in the institutional part of the curriculum.

3.4. Local programme elements

The local programme elements are worth 30 ECTS, of which 5 ECTS points are electives.

Product development (local programme element)

ECTS: 5

PURPOSE

Intended learning outcomes:

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Digital modelling and manufacturing in product development
- Digitisation in product development and production
- Digital modelling and manufacturing in companies

Skills

The student must be able to:

Apply the key methods and tools of the subject area as well as the skills related to employment in the industry, including:

- Drawing on methods for digital design and production

Assess practice-oriented issues, propose and select possible solutions, including:

- Selection and assessment of IT tools in the acquisition of knowledge, data processing, evaluation, documentation and presentation

Communicate practice-oriented issues and solutions to partners and users, including:

- Presenting and selecting ideas by way of alternative solutions
- Communicating relevant results of their own work

Competencies

The student must be able to:

Manage development-oriented situations, including:

- Taking part in research and projects, including the development of alternative solutions

Participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Undertaking the development of products and/or processes in collaboration with other subject areas
- Structuring the development process in a business perspective

Acquire new knowledge, skills and competencies within the profession in a structured context, including:

- Acquiring and translating new knowledge, skills and competencies in relation to digitised product development and production

Construction (local programme element)

ECTS: 10

PURPOSE

Intended learning outcomes:

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Statics and strength of materials, including complex compound and dynamic impact on constructions
- Commonly used machine elements and dimensioning of constructions
- Sustainability from a product development perspective

The student must be able to understand practice and key theories and methods as well as the profession's use of theories and methods, including

- Tolerancing and its impact on manufacturing processes, price and use of a product.
- Product dimensioning and coherence with other decision-making in a development process
- Material properties and their implications in a product development process

Skills

The student must be able to:

Apply key methodologies, tools as well as the skills related to employment in the industry, including:

- Technical documentation

Assess practice-oriented issues, propose and select possible solutions, including:

- Assessing a product for the purpose of dimensioning
- Assessing and deciding on function, materials and manufacturing processes based on the product's total environmental impact

Communicate practice-oriented issues and solutions to partners and users, including:

- Selecting and assessing appropriate IT tools in the acquisition of knowledge, data processing, evaluation, documentation and presentation

Competencies

The student must be able to:

Manage development-oriented situations, including:

- Taking part in research and projects, including the development of alternative solutions

Participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Undertaking the development of products and/or processes in collaboration with other subject areas
- Structuring the development process in a business perspective

Acquire new knowledge, skills and competencies within the profession in a structured context, including:

- Acquiring new knowledge, skills and competencies in relation to construction, materials science, manufacturing processes, and technical documentation.

Production optimisation (local programme element)

ECTS: 10

PURPOSE

Intended learning outcomes:

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the profession and centrally applied theory and methods within:

- Companies' value chains and supply chains
- Mapping of company processes
- Visualisation of company processes
- Quality/quantity optimisation of processes
- Quality, finances, organisation

Skills

The student must be able to:

Apply the key methods and tools of the subject area as well as the skills associated with employment in the industry, including:

- Making use of production and process planning methods

- Incorporating methods for the management and communication of companies' quality and logistics tasks

Assess practice-oriented issues, propose and select possible solutions, including:

- Identifying issues in companies' value and supply chains
- Describing alternative solutions in terms of finances and use of resources

Communicate practice-oriented issues and solutions to partners and users, including:

- Presenting and selecting ideas by way of alternative solutions
- Communicating relevant results of their own work

Competencies

The student must be able to:

Manage development-oriented situations, including:

- Taking part in research and projects, including the development of alternative solutions

Participate in academic and interdisciplinary cooperation based on a professional approach, including:

- Undertaking the development of products and/or processes in collaboration with other subject areas
- Structuring the development process in a business perspective

Acquire new knowledge, skills and competencies within the profession in a structured context, including:

- Acquiring and translating new knowledge, skills and competencies in relation to the automation, production and process optimisation

3.5. Electives

The electives are described in the electives catalogue on KEA's IT portals.

3.6. Internship

Intended learning outcomes of the internship

The internship is organised so as to contribute to the student's developing practical competencies in combination with the programme's other elements. The purpose of the internship is to enable the student to apply the methods, theories and tools acquired during the course of the study programme in the implementation of specific practical assignments within the key areas of the study programme and the electives chosen by the student.

Knowledge

The student must have gained development-based knowledge and understanding of the practice of the

profession and centrally applied theory and methods within:

- The overall financial and organisational circumstances of a specific company
- The overall company description, including products and markets
- The context of the internship in relation to the company
- The student's own role in relation to the company

Skills

Under supervision, the student is able to:

- Plan and implement their own work assignments in the company
- Apply acquired and appropriate technical and analytical work methods related to employment within the industry
- Assess and communicate practice-oriented issues and problems, and list possible solutions to the company

Competencies

Under supervision, the student is able to:

- Manage and structure practical and technical situations in relation to the company
- Participate in professional and interdisciplinary cooperation with a professional approach.
- Acquire new knowledge, skills and competencies in relation to the profession

Number of ECTS points

The internship is worth 15 ECTS points.

Number of exams

The internship is finalised by way of an exam.

3.7. Rules for the completion of the internship

Internships have a duration of 10 weeks equivalent to 15 ECTS points. The internship is placed in the fourth semester, immediately before the students have to write their final project.

The internship must be completed as one of the following: (A description of the individual types of internship can be found at KEA's IT portals)

- Work placement experience
- Entrepreneurial internship
- International internship

Apart from the entrepreneurial internship, the internship requires business cooperation based on a contract which outlines the work assignments and learning outcomes of the intern and which must be approved by the student, the company and the internship supervisor.

The contract is to be filled in via KEA's IT portals.

3.8. Teaching and learning methods

The programme uses a broad range of teaching and learning methods, for example:

- Classroom teaching
- Group work
- Case-based exercises
- Company field trips
- Interdisciplinary project-oriented teaching
- Student presentations
- Cooperative learning
- Digital learning technologies and learning environments
- Workshops
- Independent study activity

Teaching and learning methods are adapted to the individual programme elements in order to develop the student's knowledge, skills and competencies. Teaching and learning methods emphasise a professional presence in the programme through a mix of theory and practical exercises.

The extent of the teaching corresponds to a full-time study programme.

The programme in Production Technology considers learning a process involving the supply of relevant knowledge and new perspectives on existing knowledge combined with the opportunity for students to work with practice-oriented assignments, alone or together with others, under the guidance of the teachers.

As far as possible, teaching and learning is based on problem formulation, project-organised, practice-oriented and visionary teaching. The students should be able to see the common thread and understand the connection to the outside world. At the same time, their imagination and creativity must be challenged.

The basic idea is that students will learn the most from their own experiences, that is by doing something rather than hearing other people talk about it. To get started, students only need the most basic knowledge, including examples of solution methods. The teacher's role is to ensure that students have the basic knowledge and to offer them guidance on an ongoing basis.

One of the goals of the programmes - a goal which is emphasised again and again by host companies and graduates - is that the graduates must be able to do application-specific work in cooperation with others - that is, they must be socially competent and apply a cooperative approach. That is why the majority of the study programme is based on group work. This means that students should be present and participate in the planned group work. A student is therefore expected to inform their group of any absence, illness, etc. as soon as possible.

Students must remember that they share the responsibility for their own learning, and experience has shown that only the students themselves are able to acquire learning through their own interest and efforts. It is the responsibility of the teachers and KEA to create such frameworks and inspire the students to be keen learners.

3.9. Differentiated teaching

Not relevant.

3.10. Reading texts in foreign languages

All teaching materials will be in English.

4. Internationalisation

4.1. Education abroad

As all the electives take place in the third semester, it is possible to take this semester abroad.

The internship and the final project in the fourth semester can also be completed abroad.

4.2. Agreements with foreign educational institutions on parallel courses

To be continuously updated on KEA's portals.

5. Exams in the programme

5.1. Programme exams

Sequencing	Exam	90 ECTS distributed on the exams	Assessment
Second semester	Product development, manufacturing and automation	60	7-point grading scale
Third semester	Semester project.	25	7-point grading scale
	Electives	5	7-point grading scale
Fourth semester	Internship exam	15	7-point grading scale
	Final project	15	7-point grading scale

5.1.1. Exam forms

Second semester

The first-year exam is an externally assessed oral exam based on a written project.

- Oral exam:

- A group presentation where each member has a 5-minute presentation to do
- Individual examination

15 min. for questions related to the content and subject of the projects.

The learning outcomes of this exam are identical to the learning outcomes of the national programme elements. See sections 3.2-3.3.

Third semester

The third-semester exam is an externally assessed oral exam based on a written project.

- Oral exam:
 - A group presentation where each member has a 5-minute presentation to do
 - Individual examination

15 min. for questions to the content and subject of the projects.

The learning outcomes of this exam are identical to the learning outcomes of all the local programme elements. See section 3.4.

The electives exam

The exam form is described in the electives catalogue. The learning outcomes of the exam are identical to the learning outcomes set out in the electives catalogue. The exam is with an internal examiner.

Fourth semester

- Internship exam:
 - The internship report constitutes the basis of assessment together with the learning outcomes of the internship, cf. sections 3.6-3.7. The exam is with an internal assessment.

The final project, which is with an external co-examiner, is based on a written project.

- 15 min. for an individual presentation
- 15 min. for questions in relation to the content of the project.
- 10 min. for deliberation and grading

The final project must show the extent to which the student has met the learning outcomes of the entire programme as set out in section 1.2.

5.1.2. Mandatory activities - attendance and submission

Attendance is not mandatory. However, by far the majority of the programme is about students becoming competent cooperation partners. This is one of the reasons why this programme is based on group work, and in order to get a good outcome, students must necessarily take part in this group work. Therefore, we recommend that students participate in the teaching and hand in and present the assignments and projects involved.

Exam forms based on the assessment of written work require that the written part should be handed in on time and satisfy all the formal requirements for the exam.

5.1.3. Exam organisation

The project report for the first-year exam is based on group work. The final project and the internship report must be prepared individually.

5.2. Programme exams and their placement

See section 5.1 and 5.1.1.

The exact exam times will be published each semester through KEA's IT portals.

5.3. First-year exam

The first-year exam is a screening exam which must be passed by the end of the first year of study to allow the student to continue their studies. The first-year exam takes place at the end of the second semester.

5.4. Requirements for written assignments and projects

Second semester (First-year exam)

Formal requirements for the report

The report is based on an approved synopsis.

The report must consist of min. 35 and max. 50 actual A4 pages including graphics.

Use font size 12 in an easy-to-read font and 1½ line spacing.

Cover page, title page, table of contents, abstract, division of work, appendix, references and bibliography are not included in the total number of pages.

At least half of the report must consist of graphical illustrations, such as tables, diagrams, sketches, drawings, graphs and images.

The work division must be entered in an Excel sheet available on FRONTER and appended to the report as a PDF file.

The projects will be scanned for plagiarism, which also involves the reuse of more than one sentence from students' own previous project unless this has been referenced.

The first page of the report is a title page which must include the following:

- The report's title
- Full names of all group members

- Photos of all group members
- KEA name and logo
- Names of affiliated teachers/supervisors
- Number of characters in the report including spaces.
- Assignments given by companies or which have a clear company association require the inclusion of the name of the company, a contact and an e-mail address.
- Indication of whether the report may be published or not

The readability of a project report will form part of the basis for the assessment, and any deviation from the above-mentioned formal requirements will have an influence on the overall assessment and grading of the report. In the extreme, the project may be rejected.

Submission

Reports and synopsis are to be saved in pdf format and uploaded under “Hand in exam paper” in WISEflow.

NB: Max file size is 25 MB.

For group hand-ins, all members of the group must hand in the material in the respective flows.

All appendices must be compiled in a ZIP-file and uploaded under “Appendices” in WISEflow.

- Appended material that can be saved as a PDF file must be compiled in a single file
- The first page is a table of contents of all appendices and files
- Excel documents and Microsoft Project files and SolidWorks files, if any, must be submitted in the original format/version.

Appendices will not be assessed. Students must therefore ensure that all core areas are represented in the report. It is recommended that students select one or two examples of technical documentation to include in the report and enclose the remaining drawings as appendices.

As it should be possible to edit, scan and flag texts and tables, reports uploaded as PDF image files will not be accepted.

Oral performance

The duration of the presentation depends on the size of the group

- Groups of one or two members will have 15 minutes for the oral presentation
- Groups of three or more will have five minutes for each group member
- Exam time is 20 min./student including grading
- Break between groups: 10 min

The presentation must be based on the report and the theory and methods applied. It may also include further studies and theories as well as physical models that can help support the project.

Assessment criteria

The report and the oral representation must demonstrate that the group and the individual student have acquired the knowledge, skills and competences to apply the methods and theories on which the

teaching is based. The more the student draws upon relevant methods and theories, correctly and systematically, to shape the direction of the project, the better the overall assessment and grading will be.

Differentiation

First semester

- Students must demonstrate their knowledge of tools, theories, and methods from the first semester teaching in relation to a given issue/case

Second semester

- Students must demonstrate their knowledge of tools, theories, and methods from the first and second semester teaching in relation to a problem defined by the students themselves
- Students are required to draw partial conclusions from the applied tools, theories and methods, which must be used to validate any selection and/or deselection as well as reflection on the results of the project

Third semester

- Students must demonstrate competence in selecting relevant tools, theories, and methods from the first, second and third semester teaching to be brought into play in resolving a company-specific problem
- Students are required to draw partial conclusions from the applied tools, theories and methods, which must be used to validate any selection and/or deselection as well as reflection on the results of the project

Fourth semester

- The individual student must demonstrate competence in selecting relevant tools, theories, and methods from the first, second and third semester teaching to be brought into play in resolving a company-specific problem.
- The individual student is required to draw partial conclusions from the applied tools, theories and methods, which must be used to validate any selection and/or deselection as well as reflection on the results of the project.
- The tools, theories and methods applied in the various core areas of the study should ideally be linked to help support the progression of the project.

5.5. Requirements for the final exam project

The final exam project is assessed at an individual external exam. The exam consists of a written project report, a presentation and an oral exam. The assessment is based on an overall assessment of the project and the oral performance. Students are given one aggregate grade.

The exam must demonstrate the extent to which the student has achieved the learning outcomes of the programme as set out in section 1.2.

The final exam project must take as its starting point a practice-oriented problem, and the problem formulation is to be prepared by the student in consultation with KEA and a company. KEA approves the main subject and problem formulation.

Formal requirements

The report is based on an approved synopsis.

- Max. 40 actual pages incl. graphics (with the exclusion of cover page, table of contents and sources / bibliography)
- Use font size 12 in an easy-to-read font
- The title page must contain the following information:
 - The report's title
 - The student's full name
 - KEA name and logo
 - Names of affiliated teachers/supervisors
 - Number of characters including spaces.
 - Assignments given by companies or which have a clear company association require the inclusion of the name of the company, a contact and an e-mail address

Non-observance of the max. number of pages may have an impact on the grade. If the max. number of pages is exceeded by more than 25%, the formal requirements will not have been observed, and the project may be rejected.

Projects are generally expected to be closely related to the business community, and it is therefore essential that it appears CLEARLY from the title page which company was involved and if the report CANNOT be made publicly available. See also the section on publication.

The report is expected to make use of visual communication tools, including sketches, figures, diagrams, etc.

Please note that the projects will be scanned for any plagiarism, which also involves the reuse of more than one sentence from students' own previous project unless this has been referenced.

Submission

Reports and synopsis must be saved in pdf format and uploaded under "Hand in exam paper" in WISEflow.

NB: max file size is 25 MB. Appendices must be compiled in a single pdf file with a table of contents. Excel documents and Microsoft Project files to be submitted in the original format/version. Appendices will not be assessed.

As it should be possible to edit, scan and flag texts and tables, reports uploaded as PDF image files will not be accepted.

For group hand-ins, all members of the group must hand in the material in the respective flows. The name of all group members must appear from the title page/cover page. The final report must be submitted no later than 12:00 on the dates that appear from your semester plan.

Otherwise, students will have used one exam attempt.

Duration

The procedure for the exam - 40 min. in total - relates only to the final project.

- 15 min. for an individual presentation
- 15 min. for questions in relation to the content of the project.
- 10 min. for deliberation and individual grading
- 5 min. break between students

5.6. How important are writing and spelling skills in terms of the assessment?

The assessment of the final project includes not only the academic content but also the student's writing and spelling. The student's writing skills are weighted 10%, whereas the academic content is weighted 90%.

Spelling and writing skills may be disregarded by KEA upon the student's documentation of a relevant specific impairment.

5.7. Use of materials and aids

All materials and aids, including electronic aids, are allowed unless otherwise stated in the individual exam. KEA may restrict the access to electronic devices for reasons of capacity.

5.8. Special exam conditions

Examinees with physical or mental impairments and examinees with corresponding difficulties may be granted specific exam conditions where this is necessary to give them equal status to other examinees in the exam situation. Special examination conditions must, however, not change the standard of the exam.

Examinees with a non-Danish background are allowed to bring a dictionary to exams where materials and aids are not allowed.

An application for the granting of special exam conditions must be in writing and submitted to the head of programme no later than one month before the exam is to be held. Documentation of impairment must be attached to the application. As a rule, extra time at the exam means 25% extra time for the exam and the preparation.

5.9. Make-up exams

Students who have been prevented from taking an examination due to a documented illness or another unforeseen circumstance will be given the opportunity to take a new exam as soon as possible. If the exam is in the final exam period of the programme, the student must be allowed to take the exam in the same period or in continuation of this period.

Illness must be documented by a medical certificate, and KEA must have received the medical certificate three working days after the exam at the latest. If the illness is not documented, the student will have used an examination attempt. The cost of obtaining a medical certificate is borne by the student.

5.10. Examination language

All exams will be conducted in English.

5.11. Commencement of studies exam

A commencement of study exam will be held before 1 October. The exam is an academic exam of moderate complexity based on key elements of the teaching. The exam is written and assessed as pass/fail. The exam is passed if 80% of their answers are correct.

Students who fail the exam at the first attempt must pass a re-exam. Students who pass neither the exam nor the re-exam will be disenrolled from the programme. The exam does not fall within the scope of chapter 10 of the Examination Order, which means that the student cannot complain about the assessment.

5.12. Use of own and others' written work (plagiarism)

Projects and other material in connection with exams must be drawn up by the students themselves.

If students unlawfully use other people's work as their own (plagiarism) or use their own previously assessed work without references, they will be expelled from the exam.

Students may also be expelled after the exam.

Expulsion from an exam due to cheating means that any grade already awarded will be withdrawn, and the student will have used one exam attempt.

For information about plagiarism, see www.stopplagiat.nu.

5.13. Exam cheating and disruptive behaviour during exams

Cheating at exams will be handled in accordance with the rules set out in the Ministerial Order on Examinations on Professionally Oriented Higher Education Programmes (the Examination Order).

Students who cheat at an exam will be expelled from the exam.

If cheating occurs under aggravating circumstances, the student may be expelled from the programme for a shorter or longer period. With expulsion for cheating under aggravated circumstances, a written warning will be given stating that repetition could lead to permanent expulsion from the programme.

Cheating includes:

- Obtaining unlawful help during the exam
- Providing unlawful help to other students during the exam
- Using other people's work as one's own (plagiarism – see www.stopplagiat.nu)
- Using own previously assessed work without references (plagiarism – see www.stopplagiat.nu)
- Using materials and aids not permitted for the exam in question

Expulsion from an exam due to cheating means that the awarded grade will be withdrawn, and the student will have used one exam attempt.

If students exhibit **disruptive behaviour** during an exam, KEA may expel them from the exam. In less serious cases, the institution will give the student a warning.

6. Other rules governing the programme

6.1. Rules on compulsory attendance

The student's presence and active participation are required for most parts of the programme; however, KEA does not want to make attendance compulsory for all the teaching in the programme. There are, however, activities in the individual semesters which the student must take part in. Such activities include:

- Assessments and exams. Absence from such activities will be considered in accordance with the exam rules.
- Status postings, written and oral status tests as well as activities described as activities with mandatory attendance in the semester descriptions, for example because of assignment introductions and company visits.

6.2. Credit transfer

Successfully completed programme elements are equivalent to corresponding programme elements at other educational institutions offering the programme.

Students are obliged to provide information on completed programme elements from other Danish or foreign higher education programmes and on any employment for which credit transfer may be granted. On a case-by-case basis, KEA approves credit transfers based on completed programme elements and job experience comparable to subjects, programme elements and internships. The decision is based on an academic evaluation.

6.3. Credit transfer of subjects covered by the national part of the curriculum

Students can apply for pre-approved credit transfer. In case of pre-approval of a period of study in Denmark or abroad, the student is obliged, after completing the period of study, to document the programme elements completed during the approved period of study. Upon obtaining the pre-approval, the student must consent to KEA's requesting the necessary information after the student has completed the period of study. If a credit transfer is granted, programme elements are deemed to have been completed if they have been passed in accordance with the rules applicable to the programme.

6.4. Credit transfer of subjects covered by the national part of the curriculum

Based on an academic assessment, KEA may approve that programme elements completed at another Danish or foreign higher education replace programme elements covered by this curriculum.

6.5. Criteria for the assessment of active enrolment

A student will be called in for a talk in case of decreasing or no clear signs of study activity (active enrolment) as defined in section 5.1.2.

6.6. Disenrolment due to insufficient study activity

Enrolment on the programme can be terminated for students who have not passed at least one exam within a consecutive period of at least one year.

6.7. Exemption rules

KEA may, due to exceptional circumstances, grant exemptions from the rules in this curriculum laid down solely by KEA or jointly by the educational institution offering the programme.

6.8. Complaints

Complaints regarding exams will be handled in accordance with the rules set out in Chapter 10 of the Ministerial Order on Examinations on Professionally Oriented Higher Education Programmes (the Examination Order).

When should a complaint be submitted? Complaints relating to examinations and grading must be submitted within two weeks of the assessment (grade) being announced.

How should a complaint be submitted? Complaints must be submitted individually and in writing to KEA at kvalitet@kea.dk stating the reasons for the complaint. Complaints submitted jointly by several students may be rejected.

What may the complaint concern? A complaint may concern the basis for examination, the examination process or the assessment (grade).

What may the complaint result in? If a student complaint is successful, they will be offered a new assessment (for written exams) or a re-exam (for oral exam). A grade cannot be changed administratively. A grade will only be changed if the new examiners award a different grade according to their professional assessment. The new grade may be higher or lower than the original grade.

Who handles the complaint? Complaints are normally handled by KEA Quality Assessment. This does not, however, apply to complaints concerning the basis for examination if the exam is organised by the Danish Agency for Higher Education. In such cases, the complaint is forwarded to the Danish Agency for Higher Education together with KEA's opinion.