

CURRICULUM
for
the Academy Profession Degree Programme in
Production Technology

Revised 9 July 2018

This, the national part of the curriculum for the Academy Profession Degree Programme in Production Technology (AP Graduate in Production Technology), is issued in accordance with subsection 18(1) of Ministerial Order no. 100 of 8 February 2018 (*Bekendtgørelse om tekniske og merkantile erhvervsakademiuddannelser og professionsbacheloruddannelser*). The national part of the curriculum is supplemented by an institutional part, which is laid down by the individual education institutions offering the programme.

This curriculum was prepared by the Education Network for the Academy Profession Degree Programme in Production Technology. It has been approved by the boards of all programme providers – or alternatively by rectors duly authorised – following consultations with the education committees at each of the education institutions and with the Chairmanship of External Examiners for the study programme.*

* In the event of any discrepancies between this English translation and the original Danish version of the curriculum, the Danish version takes precedence.

Contents

1. Intended learning outcomes of the study programme	3
2. The study programme comprises seven national programme elements	4
2.1. Product development	4
2.2. Construction	5
2.3. Technical documentation	6
2.4. Materials and manufacturing processes	7
2.5. Production engineering.....	8
2.6. Automation.....	9
2.7. Business technology	10
2.8. Number of exams in national programme elements.....	11
3. Internship	12
4. Requirements for the final degree project.....	13
5. Rules and regulations for credit transfer	13
6. Effective date and transitional regulations	14

1. Intended learning outcomes of the study programme

Knowledge

The graduate has knowledge of:

- 1) technical, organisational, financial, quality- and environmentally-related theories and methods applied by companies in the areas of production, product development as well as technical sales and procurement
- 2) technical, organisational, financial, quality- and environmentally-related concepts and methods, and the graduate understands how companies apply these concepts and methods in production, product development as well as technical sales and procurement
- 3) globalisation and international development trends

Skills

In a product development process, the graduate is able to:

- 1) apply technical, innovative, creative and analytical skills relevant to employment in production, product development as well as technical sales and procurement
- 2) assess practice-related issues of a technical, organisational, financial, quality- and environmentally-related nature and propose possible solutions

3) apply technical documentation and calculation in the communication of practice-related, technical, organisational, financial, quality- and environmentally-related issues and proposed solutions to partners and users

Competences

The graduate is able to:

- 1) manage situations of a development-oriented character within production, product development as well as technical sales and procurement
- 2) take part in project management of disciplinary and multidisciplinary collaboration with a professional approach within production, product development, sales and procurement, nationally as well as internationally
- 3) acquire skills and new knowledge in relation to production, product development, technical sales and procurement in a structured context

2. The study programme comprises seven national programme elements

2.1. Product development

Contents

The programme element covers design, planning and implementation of the product development process in relation to product and process development as well as related services and associated methods.

Intended learning outcomes of Product development

Knowledge

The graduate has knowledge of and is able to understand practice and the application of methods and theory within:

- systematic development of products, processes and services
- the generation of ideas
- needs analysis
- understanding of market and business principles, including knowledge gathering and data processing methods
- aesthetics and design
- visualisation
- problem statement and requirement specification

Skills

In a product development process, the graduate is able to:

- outline product and process
- perform functional analysis

- include knowledge about market and needs
- present and select ideas by way of concept proposals
- communicate relevant results of own work
- incorporate stakeholder and user perspectives

Competences

The graduate is able to:

- participate in development and ideation processes in a systematic product development process while taking into account other subject fields in the study programme
- participate in and contribute to multidisciplinary team work
- acquire and apply new knowledge within the programme element

ECTS credits

The programme element Product development is worth 10 ECTS credits.

2.2. Construction

Contents

The programme element is about dimensioning and construction of a physical product on the basis of identified specifications and load conditions with due consideration to input and output from other programme elements.

Intended learning outcomes of Construction

Knowledge

The graduate has knowledge of practice and the application of methods and theory within:

- statics and strength of materials
- dimensioning of constructions
- commonly used machine elements and concepts
- 3D models and basic FEM (finite element method) analysis
- risk analysis

The graduate has an understanding of practice and the following theoretical and methodological fields of study:

- dimensioning of products and how this correlates with other decision-making processes in the course of a development process
- the impact of tolerancing on manufacturing processes, price and application of a product

Skills

The graduate is able to:

- calculate estimates on statically determinate constructions

- demonstrate a practical sense of the design of physical products in relation to their capability in terms of strength
- identify the various forms of tension that arise in a load-bearing construction
- identify critical points in a construction, calculate strength and subsequently dimension a construction
- incorporate standard solutions in construction design
- calculate and determine relevant tolerances for a given construction
- explain in a structured manner his/her dimensioning and construction solutions
- apply commonly used IT tools in the acquisition of knowledge, data processing, documentation and presentation

Competences

The graduate is able to:

- take part in multidisciplinary collaboration around dimensioning of simple, statically determinate constructions and include input and output from other professional fields in his/her work with specific regard to:
 - choice of material
 - producibility
 - assembly
 - function
- acquire new knowledge within the programme element

ECTS credits

The programme element Construction is worth 10 ECTS credits.

2.3. Technical documentation

Contents

The programme element concerns technical documentation with correct approval criteria according to current norms and standards.

Intended learning outcomes of Technical documentation

Knowledge

The graduate understands practice and the most important applied theories and methods within:

- structure and coherence in the construction of a 3D model
- types of technical drawing and hierarchy in relation to subsequent application
- 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 and its structure, purpose and contents

- the implication of technical forms of documentation in a global and legal context
- technical drawing as a means of communication

Skills

The graduate is able to:

- apply 3D CAD (computer-aided design) software in the construction of a 3D CAD model on part as well as assembly level
- convert sketches, concept descriptions and design calculations into a 3D CAD model
- apply 3D CAD software in the preparation of technical production drawings in accordance with current norms and standards as well as subsequent application
- prepare illustrations on the basis of 3D models and prototypes
- apply commonly used IT tools in the acquisition of knowledge, data processing, documentation and presentation

Competences

The graduate is able to:

- attend to and manage substantial parts of the technical documentation in a development process while taking into consideration input and output from other core areas
- keep abreast of developments in 3D modelling and documentation standards

ECTS credits

The programme element Construction is worth 6 ECTS credits.

2.4. Materials and manufacturing processes

Contents

The programme element is about the prerequisites for qualified selection of materials and manufacturing processes on the basis of professional and multidisciplinary parameters.

Intended learning outcomes of Materials and manufacturing processes

Knowledge

The graduate has knowledge of:

- physical properties of and suitable manufacturing processes for:
 - metals, particularly steel and aluminium
 - Plastic, elastomers and composites
 - wood
 - ceramics
 - new materials, including database searches
- surface and heat treatment of various materials
- joining technologies

- machining processes
- choice of materials in a sustainability perspective
- materials testing

The graduate understands practice and interrelationships in terms of:

- 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 graduate is able to:

- select materials based on their properties and on design requirements
- recommend manufacturing processes based on realisability
- include financial considerations in the selection of materials and processes
- assess materials as well as manufacturing process in an environmental perspective

The graduate is able to assess issues and contribute to decisions within the following:

- 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
- communication of practice-related issues and possible solutions within the programme element

Competences

The graduate is able to:

- take part in multidisciplinary collaboration on selection of materials and manufacturing processes while taking into account the framework provided by other core areas
- acquire skills and competences in relation to new knowledge that (s)he has gained about material properties and manufacturing processes

ECTS credits

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

2.5. Production engineering

Contents

The 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 graduate has knowledge of and understands:

- manufacturing and production processes
- principles in production engineering, including:
 - production layout
 - process and product flow
- basis of production, including data processing
- stock building and management
- lead time in production engineering
- allocation of resources
- costs
- physical work environment in the production process
- control measurement methods

Skills

The graduate is able to:

- prepare production layout
- translate basis of construction into basis of production
- calculate costs
- compare alternative solutions in terms of costs and resource consumption
- present his or her possible solutions and results in a practice-oriented context
- prepare production plans from the basis of production and using methodical planning tools

Competences

The graduate is able to:

- take part in multidisciplinary dialogue with other core areas on product and production optimisation
- apply commonly used IT tools in the acquisition of knowledge, data processing, documentation and presentation
- acquire skills and competences in relation to new knowledge that (s)he has gained about the programme element

ECTS credits

The programme element Production engineering is worth 8 ECTS credits.

2.6. Automation

Contents

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

Intended learning outcomes of Automation

Knowledge

The graduate has knowledge of and understands:

- control terminology, theories and methods used in automation
- projection of pneumatics and hydraulics
- commonly used electronic control solutions
- mechanical components applied in pneumatics and hydraulics
- item structure in relation to automated production
- production methods of the future, in the context of digitisation

Skills

The graduate is able to:

- prepare a simple control circuit
- prepare specifications for an automated solution
- propose improvements to a product to make it suitable for automated production
- draw on company and stakeholder data material in the configuration of future production solutions
- present his or her possible solutions and results in a practice-oriented context
- prepare simple specifications for use in the development of automated solutions in a production process
- in construction design, make allowance for later automated production of a given item or product
- apply commonly used IT tools in the acquisition of knowledge, data processing, documentation and presentation
- gauge possibilities for automation of production facilities from a systems perspective

Competences

The graduate is able to:

- acquire skills and competences in relation to new knowledge that (s)he has gained about the programme element
- assess possibilities for automation of production facilities from a systems perspective

ECTS credits

The programme element Automation is worth 6 ECTS credits.

2.7. Business technology

Contents

The programme element is about understanding and working with company management systems, including payroll, stock, production, finance, quality and environmental systems

Intended learning outcomes for Business technology

Knowledge

The graduate has knowledge of and understands practice and theory in relation to:

- project management and leadership
- business economics
- production management systems
- quality control
- business organisation
- the environment, occupational health and safety and current legislation
- technical sales and procurement
- internationalisation

Skills

The graduate is able to:

- include costs as a significant factor when deciding on own solutions, including:
 - assessment of the impact on income and expenditure account and balance sheet
 - contribution to the drawing up of calculations
 - drawing up and assessment of budgets
- process and assess statistical data material in connection with quality measurement
- prepare instructions and procedures for quality control systems
- communicate issues and possible solutions through graphically illustrated material and information flow in a company
- apply commonly used IT tools in the acquisition of knowledge, data processing, documentation and presentation
- establish a comprehensive overview of the production and management systems of a company

Competences

The graduate is able to:

- take part in multidisciplinary collaboration around management and planning in a company
- contribute to the preparation of a company business plan on the basis of his/her own professional expertise
- participate in technical sales and procurement
- acquire skills and competences in relation to new knowledge that (s)he has gained about the programme element

ECTS credits

The programme element Business technology is worth 11 ECTS credits.

2.8. Number of exams in national programme elements

National programme elements in the first year of study are worth 60 ECTS and are concluded by way of an exam.

In addition, there is one exam in the final degree project. For the number of internship exams, please see section 3.

For an overview of all exams in the study programme, please refer to the institutional part of the curriculum as examination in the national programme elements described above may be combined with examination in programme elements laid down in the institutional part of the curriculum.

3. Internship

Intended learning outcomes of the study programme's internship

The internship is organised in order to contribute, in combination with the other elements of the study programme, to the student's development of practical competences. 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 graduate has knowledge of:

- 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 intern's own role in relation to the company

Skills

With supervision, the graduate is able to:

- plan and implement own work assignments in the company
- apply acquired and appropriate technical and analytical work methods related to employment within the industry
- evaluate and communicate practice-based issues and propose possible solutions to the company

Competences

With supervision, the graduate is able to:

- manage and structure practical and technical situations in relation to the company
- acquire new knowledge, skills and competences in relation to the profession
- participate in professional and multidisciplinary collaboration with a professional approach

ECTS credits

The internship is worth 15 ECTS credits.

Number of exams

The internship is finalised by way of an exam.

4. Requirements for the final degree project

The intended learning outcomes of the final degree project are identical to those of the study programme as a whole, as set out in chapter 1 above: Intended learning outcomes of the study programme.

The final degree project must demonstrate the student's understanding of practice as well as core applied theories and methods in relation to a practice-based issue grounded in a specific task within the education field. The issue, which must be key to the education field and the profession, is prepared by the student and may be prepared in collaboration with a private or public company. The education institution must approve the issue.

In consultation with the education institution, the student has the option of giving greater priority to specific programme elements in his/her examination basis.

Final degree project examination

The final degree project concludes the study programme and takes place in the final semester, once all prior exams have been passed.

ECTS credits

The final degree project is worth 15 ECTS credits.

Examination method

The examination consists of an externally assessed oral and written exam. A combined, individual mark according to the 7-point grading scale is given for the written project and the oral performance.

5. Rules and regulations for credit transfer

Completed programme elements are equivalent to corresponding programme elements at other education institutions offering the study programme.

Students are obliged to disclose information about education elements that they may have completed at any other Danish or foreign higher education institution as well as any work experience which may reasonably be presumed to earn academic credit.

The education institution considers each potential credit transfer based on the extent to which completed education elements and work experience match modules or other academic or practical components of the study programme.

The decision whether to award credit transfer is based on an academic assessment.

Following completion of pre-approved studies in Denmark or abroad, students are obliged to document that the education elements forming part of the pre-approval were in fact completed.

When applying for pre-approval, the student must consent to the education institution collecting any required information after the student's completion of the study-abroad period.

On approval according to the above, an education element is considered completed if it was passed in accordance with the regulations governing the study programme in question.

6. Effective date and transitional regulations

Effective date

This national part of the curriculum comes into effect on 01/09/2018 and will apply to all students as of this date.

Transitional regulations

Please refer to the institutional part of the curriculum.