

Curriculum for the Academy Profession Degree Programme
in Service Engineering – Electrical Power Engineering
Spring 2015

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Degree Programme in
Service Engineering
– Electrical Power Engineering

Spring 2015

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Please note: This is a translation of the Danish curriculum for the Academy Profession Degree Programme in Service Engineering, which is currently only taught in Danish at UCN. The purpose of this translation is to inform non-Danish speakers of the contents of the Danish curriculum. Only the Danish curriculum is legally valid.

2. Curriculum framework

The objective of the academy profession degree programme in service engineering is to qualify the graduates to independently handle the planning, installation and operation of systems within electrical power engineering or gas and heating, water and sanitation. The Academy Profession Degree Programme in Service Engineering gives graduates the right to bear the title AP Graduate in Service Engineering. The Danish title is Installatør AK. The study programme is offered in accordance with level 5 of the Qualifications Framework for Lifelong Learning. This is the national section of the curriculum for the Academy Profession Degree Programme in Service Engineering, under Ministerial Order no. 791 of 20 August 2009. Link to The Ministerial Order (in Danish): <https://www.retsinformation.dk/forms/R0710.aspx?id=126478>

The service engineering programme has two fields of study: Electrical power engineering and Heating, water and sanitation, both worth 120 ECTS credits.

Applicants are admitted to the study programme in accordance with schedule 1, "Admission requirements for admission to academy profession degree programmes..." in Ministerial Order no. 223 of 11 March 2014 on admission to academy profession degree programmes and professional bachelor's degree programmes (the Admission Order). Link to the Ministerial Order (in Danish): <https://www.retsinformation.dk/forms/R0710.aspx?id=162040>

The curriculum for the academy profession degree programme in service engineering is drawn up by the network of approved providers of the programme, according to the guidelines in the above and the following ministerial orders:

- Consolidating act no. 214 of 27 February 2013 on business academies of professional higher education (Danish title: Bekendtgørelse af lov om erhvervsakademier for videregående uddannelser)
- Consolidating act no. 467 of 8 May 2013 on academy profession programmes and professional bachelor programmes (Danish title: Bekendtgørelse af lov om erhvervsakademiuddannelser og professionsbacheloruddannelser)
- Ministerial Order no. 1521 of 16 December 2013 on academy profession programmes and professional bachelor programmes (the Programme Order) (Danish title: Bekendtgørelse om erhvervsakademiuddannelser og professionsbacheloruddannelser (LEP-bekendtgørelsen))
- Ministerial Order no. 1519 of 16 December 2013 on examinations on professionally oriented higher education programmes (the Exam Order) (Danish title: Bekendtgørelse om prøver i erhvervsrettede videregående uddannelser)
- Ministerial Order no. 262 of 20 March 2007 on the grading scale and other forms of assessment (Danish title: Bekendtgørelse om karakterskala og anden bedømmelse)

2.1 Reading instructions

This Curriculum for the service engineering study programme provides the basic rules for the study programme, a description of the different educational components (subjects) and the learning outcomes of the programme:

- The overall core areas for the fields of study
- The compulsory educational components that are common to the two fields of study
- The compulsory educational components that are specific to the two fields of study
- Internship
- Exams
- Institutional section, including elective educational components

2.2 The two fields of study

Electrical power engineering

1st year of study		2nd year of study	
	ECTS		ECTS
Installation technology		The company	
Linguistic communication	5	Quality, safety and environment	5
Technical documentation	5		
Mathematics	5	Organisation and management	5
Information technology	5		
The company		Technology and project design; electrical power engineering	
Project management and works contract management	5	Building installations (2)	5
Financial situation and business activities	5	Electrical supply systems	5
Technology and project design; electrical power engineering		Elective educational components	15
Technical calculation	5		

1st year of study		2nd year of study	
Building installations (1)	15	Internship	15
Building automation	5		
Automation for small machinery and plant	5	Final exam project	10
	60		60

Heating, water and sanitation

1st year of study		2nd year of study	
	ECTS		ECTS
Installation technology		The company	
Linguistic communication	5	Quality, safety and environment	5
Technical documentation	5		
Mathematics	5	Organisation and management	5
Information technology	5		
The company		Technology and project design; heating, water and sanitation	
Project management and works contract management	5	Indoor climate, ventilation (2)	5
Financial situation and business activities	5	Gas technology (1)	5
Technology and project design; heating, water and sanitation		Elective educational components	
Technical calculation	5	Internship	15
Indoor climate, ventilation (1)	5		
Heating	10		
Sanitation	10	Final exam project	10
	60		60

3. Programme core areas and ECTS credits

The programme has three core areas worth a total of 80 ECTS in each field of study:

- Installation technology (20 ECTS)
- The company (20 ECTS)
- Technology and project design, electrical power engineering (40 ECTS)
- Technology and project design, heating, water and sanitation (40 ECTS)

3.1 Installation technology 20 ECTS

Including linguistic communication, technical documentation, mathematics and information technology.

Knowledge

The students should have acquired knowledge about

- theory and methods of mathematical calculations;
- applicable laws and regulations; and

- standards for technical documentation.

Skills

The students should be able to

- communicate practical issues and solution proposals to users and partners in Danish and at least one foreign language;
- use up-to-date and relevant tools for communication and documentation; and
- measure and evaluate data in relation to technical issues.

Competences

The students should be able to

- acquire new knowledge, skills and competences in respect of the profession.

3.2 The company 20 ECTS

Including project management and works contract management, financial situation and business activities, organisation and management as well as quality, safety and environment.

Knowledge

The students should have acquired knowledge about

- central concepts and methods within works contract management;
- relevant tools and practice in connection with running a business; and
- applicable laws and regulations.

Skills

The students should be able to

- prepare tender documents and sales material as well as calculate and make tenders;
- handle and manage installation tasks, projects and works contracts;
- take a professional approach to discipline-specific and interdisciplinary collaboration;
- conduct management tasks and use up-to-date and relevant management tools as well as handle authorisation responsibilities in connection with project design according to applicable law, rules and quality requirements; and
- run and operate a service engineering business.

Competences

The students should be able to

- set up or take over as well as run a service engineering business;
- be part of the management functions of a service engineering business as well as assume the responsibilities of manager; and
- handle the role of project manager.

3.3 Technology and project design; electrical power engineering (40 ECTS)

Including technical calculation of electricity supply systems, building installations as well as building automation and automation for minor machinery and plant.

Knowledge

The students should have acquired knowledge about

- the theory of the electrical power engineering area and its significance to the function and energy effects of installations and systems at a specialised level;
- implementation of projects in connection with electrics and small automatic systems; and
- electrical installations and installation works on electrics.

Skills

The students should be able to

- plan, design, document and implement electrical engineering projects and works contracts concerning electrical installations, building automation and small automatic systems;
- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions; and
- in connection with electrical engineering projects and works contracts, independently assess and implement practical electrical engineering solutions to problems, in consideration of safety, energy and environmental conditions.

Competences

The students should be able to

- design, plan and manage the execution of electrical engineering installations, building automation and small automatic systems, using state-of-the-art technology; and
- handle situations of a development-oriented nature within the electrical engineering area.

3.4 Technology and project design; heating, water and sanitation (40 ECTS)

Including technical calculation of energy supply systems as well as building installations for indoor climate, water, sanitation and gas.

Knowledge

The students should have acquired knowledge about

- the theory of the heating, water and sanitation area and its significance to installation technology in gas and heating, water and sanitation systems;
- project design of gas and heating, water and sanitation systems at a user-oriented level; and
- heating, water and sanitation installations and installation works on supply and production systems.

Skills

The students should be able to

- plan, design, document and implement heating, water and sanitation projects and works contracts;
- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions; and

- in connection with heating, water and sanitation projects and works contracts, independently assess and implement practical heating, water and sanitation solutions to problems, in consideration of safety, energy and environmental conditions.

Competences

The students should be able to

- design, plan and manage the implementation of gas and heating, water and sanitation installations, using state-of-the-art technology; and
- handle situations of a development-oriented nature within the heating, water and sanitation area.

4. Compulsory educational components within the core programme areas

There is a total of 14 compulsory educational components distributed on the 1st and 2nd years of study within the three core areas for each field of study. See an overview of the exams in chapter 5, *Number of exams in the compulsory educational components* and chapter 8 *Overview of exams*.

Compulsory educational components for Electrical power engineering and Heating, water and sanitation together:

- Linguistic communication (5 ECTS)
- Technical documentation (5 ECTS)
- Mathematics (5 ECTS)
- Information technology (5 ECTS)
- Project management and works contract management (5 ECTS)
- Financial situation and business activities (5 ECTS)
- Quality, safety and environment (5 ECTS)
- Organisation and Management (5 ECTS)

Compulsory educational components for Electrical power engineering:

- Technical calculation (5 ECTS)
- Building installations (1) (5 ECTS)
- Building automation (5 ECTS)
- Automation for small machinery and plant (5 ECTS)
- Building installations (2) (5 ECTS)
- Electricity supply systems (5 ECTS)

Compulsory educational components for Heating, water and sanitation:

- Technical calculation (5 ECTS)
- Indoor climate/ventilation (1) (5 ECTS)
- Indoor climate/ventilation (2) (5 ECTS)
- Heating (10 ECTS)
- Sanitation (10 ECTS)
- Gas technology (1) (5 ECTS)

4.1 Linguistic communication (5 ECTS)

Contents

Writing business letters in Danish and a foreign language
Conversations and discussions in a foreign language
Reading and understanding manuals and data sheets in a foreign language
Presentation of a subject to an assembly

Knowledge

The students should have acquired knowledge about written and oral communication

- within technical and business-related subjects;
- in respect of Danish and international cooperation partners; and
- with a view to managerial communication and presentation technique.

Skills

The students should be able to

- understand, communicate and explain technical instructions to stakeholders; and
- present suggestions and solutions to stakeholders, in Danish and at least one foreign language.

Competences

The students should be able to

- cooperate with Danish and international stakeholders;
- act within their field in Danish and international cultures; and
- ensure effective communication in their own company or department.

4.2 Technical documentation (5 ECTS)

Contents

Software for drawing and documenting technical installations
Standards for technical documentation
Updating of standards

Knowledge

The students should have acquired knowledge about

- documentation of installations
- preparation of project reports, dissertations and manuals; and
- rules and standards.

Skills

The students should be able to

- prepare up-to-date documentation of work; and
- structure and organise knowledge and data.

Competences

The students should be able to

- handle and ensure correct technical documentation.

4.3 Mathematics (5 ECTS)

Contents

Basic mathematics and physics
Equations
Units and prefix
Trigonometry
Calculator and spreadsheets

Knowledge

The students should have acquired knowledge about

- basic relevant mathematical tools; and
- basic relevant natural science tools.

Skills

The students should be able to

- use basic relevant mathematical tools; and
- use relevant natural science tools.

Competences

The students should be able to

- choose relevant mathematical and natural science tools and make technical calculations within the core areas.

4.4 Information technology (5 ECTS)

Contents

Software for calculation of installations
Updating of software and methods
Internet

Knowledge

The students should have acquired knowledge about

- relevant and up-to-date IT software; and
- relevant and up-to-date calculation software.

Skills

The students should be able to

- use relevant and up-to-date IT software; and
- use relevant and up-to-date calculation software.

Competences

The students should be able to

- use software to calculate and dimension installations; and
- analyse technical systems using relevant software.

4.5 Project management and works contract management (5 ECTS)

Contents

Plan and organise as well as manage and control tasks, projects and works contracts
Prepare tender and sales material as well as calculation
Tendering and works contract law

Knowledge

The students should have acquired knowledge about

- the project and works contract manager's function, tasks and role as well as responsibility in carrying out projects and works contracts;
- relevant laws and regulations as well as responsibilities, commitments and rights in connection with works contracts;
- modern calculation methods and up-to-date price calculation programmes;
- procedures and rules in connection with tendering and contract formation; and
- project models and control processes as well as the methods and tools of the project work form and group-dynamical work processes.

Skills

The students should be able to

- build up a project organisation, handle cooperation processes as well as establish and communicate interdisciplinary cooperation;
- use relevant tools for planning, control and implementation as well as documentation of projects;
- prepare tender and sales materials;
- calculate price and make offers; and
- plan, organise and manage day-to-day work tasks and major works contracts.

Competences

The students should be able to

- manage the role of advisor as well as project or works contract manager; and
- manage installation technology projects and works contracts as well as day-to-day tasks in a service engineering business.

4.6 Financial situation and business activities (5 ECTS)

Contents

Establish and run a business
Business economics and management
Relevant business law topics

Knowledge

The students should have acquired knowledge about

- establishment, building up and taking over of a business as well as development and creation of idea and a business foundation;
- central methods and practice within business activities;

- purchasing and material management, control of work assignments and staff as well as control of orders, delivery and sales;
- accounts and budgets as well as financial analysis;
- financial and administrative management of business, assignments and projects as well as works contracts; and
- the central laws and regulations for the relationship between a service engineering business and its stakeholders.

Skills

The students should be able to

- establish, take over and build up a business as well as plan, manage and organise day-to-day operations;
- prepare an account, set up budgets as well as assess investment needs and finances;
- manage and administer the financial situation of a business and a works contract;
- use relevant analysis tools for finances, operation and management;
- create a relevant basis for decisions and convert it into specific action plans for finances and operation; and
- prepare business plans.

Competences

The students should be able to

- establish, take over and run a service engineering business; and
- handle management tasks in connection with control of operations and finances.

4.7 Quality, safety and environment (5 ECTS)

Contents

Quality and quality management

Environment and environmental management

Work environment, safety and job satisfaction

Relevant laws and regulations for environment and work environment

Knowledge

The students should have acquired knowledge about

- occupational diseases and trade-relevant work environment problems as well as environmental considerations and environmental policy;
- applicable legislation and industry requirements concerning quality, safety, work environment and environment; and
- relevant control systems to secure safety and work environment.

Skills

The students should be able to

- analyse and assess work environment and environmental considerations as well as quality requirements;
- in accordance with applicable legislation, rules and industry requirements, develop, build up, implement, maintain and use relevant control systems to secure quality, safety and work environment as well as environment; and

- handle an authorisation responsibility as well as quality assure and draw up maintenance plan for installation, project and works contract.

Competences

The students should be able to

- undertake management tasks that include responsibility for work environment, environment and quality; and
- administer a managerial responsibility conditioned on authorisation

4.8 Organisation and management (5 ECTS)

Contents

Establishment and building up of organisations as well as organisation development
Management of organisations, systems, cultures and staff as well as development processes
Labour and employment law as well as relevant elements from business law

Knowledge

The students should have acquired knowledge about

- business forms, organisation models, innovation and organisation development, the formal and informal organisations of the workplace, organisation of staff as well as building up of staff groups;
- strategic management and the manager's functions, tasks and roles, relevant management tools, management and cooperation, general occupational psychology as well as change and development processes; and
- the Danish labour market model and employment law.

Skills

The students should be able to

- organise company and workplace as well as establish, build up and develop organisations and staff;
- handle organisational models and cultures as well as social and interpersonal relations;
- work on strategic management and use relevant management tools in a given situation as well as handle change, development and implementation processes; and
- manage a staff, ensure job satisfaction and motivation, attract and retain staff as well as handle cooperative and staff relationships according to applicable laws and regulations.

Competences

The students should be able to

- be part of the management functions of a service engineering business as well as assume staff responsibility; and
- take part in the development of organisation and staff as well as handle development, change and implementation processes in connection with innovation.

4.9 Technical calculation (5 ECTS)

Contents

Basic calculation of electric circuits and electric machines

Knowledge

The students should have acquired knowledge about

- the theory of electrical power engineering and its significance to the function of electrical installations and systems;
- the passive components of the electrical power engineering area and their use;
- methods and tools for calculation of electric circuits; and
- the function and practical construction of electric machines at a basic level.

Skills

The students should be able to

- make calculations of common electric circuits built up of passive components; and
- assess and communicate practice-related issues within the theory of the electrical power engineering area as well as set up possible solutions in relation to the theory.

Competences

The students should be able to

- acquire skills and new knowledge in a structured context in relation to the basic theory of the electrical power engineering area.

4.10 Building installations (1) (15 ECTS)

Contents

Planning, design, execution, operation, inspection and maintenance of electrical building installations

Knowledge

The students should have acquired knowledge about

- the structure of electrical building installations, components used and their function;
- relevant laws and regulations within the area; and
- concepts and methods as well as be able to reflect on the use of these in relation to the area.

Skills

The students should be able to

- plan, design and document electrical building installations;
- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions within the area; and
- assess and implement practice-related solutions within the area.

Competences

The students should be able to

- design, plan and manage the execution of electrical building installations, using state-of-the-art technology; and

- handle development-oriented situations in relation to the area.

4.11 Building automation (5 ECTS)

Contents

Planning, design and execution of building automation using technologies within Intelligent Building Installations (IBI) and Building Management Systems (BMS).

Knowledge

The students should have acquired knowledge about

- electric and electronic systems for control and regulation of the energy supply of buildings;
- components, their use and function; and
- concepts and methods as well as be able to reflect on the use of these in relation to the area.

Skills

The students should be able to

- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions within the area; and
- independently assess and implement practical solutions to problems within the area, considering power engineering and environmental conditions.

Competences

The students should be able to

- take a professional approach to discipline-specific and interdisciplinary collaboration; and
- handle development-oriented situations in relation to the area.

4.12 Automation for small machinery and plant (5 ECTS)

Contents

Automation and electrical installations on small machinery and plant

Knowledge

The students should have acquired knowledge about

- electric and electronic systems for controlling small machinery and plant, components, their use and function; and
- applicable standards within the area.

Skills

The students should be able to

- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions within the area; and
- independently assess and implement practical solutions to problems within the area, considering power engineering and environmental conditions.

Competences

The students should be able to

- take a professional approach to discipline-specific and interdisciplinary collaboration; and

- handle installation-technology situations in relation to the area.

4.13 Building installations (2) (5 ECTS)

Contents

Planning, design, execution, operation, inspection and maintenance of electrical building installations

Knowledge

The students should have acquired knowledge about

- the structure of electrical building installations, components used and their function;
- relevant laws and regulations within the area; and
- concepts and methods as well as be able to reflect on the use of these in relation to the area.

Skills

The students should be able to

- plan, design, document, commission and service electrical building installations;
- assess system forms as well as choose relevant, up-to-date and financially advantageous solutions within the area; and
- independently assess and implement practical solutions to problems within the area, considering power engineering and environmental conditions.

Competences

The students should be able to

- design, plan and manage the execution of electrical building installations, using state-of-the-art technology; and
- handle development-oriented situations in relation to the area.

4.14 Electricity supply systems (5 ECTS)

Contents

Planning, design, operation, inspection and maintenance of electricity supply systems in the medium-voltage and low-voltage distribution networks.

Knowledge

The students should have acquired knowledge about

- the structure, components and function of the electricity supply system;
- applicable laws and regulations within the area; and
- concepts and methods as well as be able to reflect on the use of these in relation to the area.

Skills

The students should be able to

- plan, design, document, commission and service electricity supply systems; and
- assess and implement practice-related solutions within the area.

Competences

The students should be able to

- take a professional approach to discipline-specific and interdisciplinary collaboration within the area; and
- handle development-oriented situations in relation to the area.

4.15 Technical calculation (5 ECTS)

Contents

Technical calculation of heating, water and sanitation systems using relevant and up-to-date mathematical and physical disciplines and tools.

Knowledge

The students should have acquired knowledge about

- mathematical and physical methods and tools for calculation of energy supply systems and building installations.

Skills

The students should be able to

- construct technical systems by means of mathematical and physical disciplines and tools.

Competences

The students should be able to

- analyse and construct technical systems by means of relevant and up-to-date mathematical and physical disciplines and tools.

4.16 Indoor climate/ventilation (1) (5 ECTS)

Contents

General theory on ventilation principles and plant types, including mechanical exhaust and injection as well as CAV and VAV

Thermal and atmospheric indoor climate Volume flows and required supply of outdoor air

Fire protection of ventilating plant Regulations, laws and directions concerning ventilating plant Air distribution systems, including pressure drop calculations, fans and preadjustment, air currents in closed spaces and SEL values

Knowledge

The students should have acquired knowledge about

- construction of different types of ventilating plant;
- dimensioning and mode of operation within housing, institution and trade;
- the significance of the area and its influence on other adjacent professional groups; and
- regulations, laws and directions concerning ventilating plant.

Skills

The students should be able to

- design, dimension and establish indoor climate systems; and
- assess installation forms and choose relevant and up-to date solutions.

Competences

The students should be able to

- design and plan the execution of works on indoor climate systems; and
- calculate the design air volumes and plan ducting systems

4.17 Indoor climate/ventilation (2) (5 ECTS)

Contents

General theory on sound and sound calculations in ventilating plant

Air treatment, change of state, heating, cooling and humidification IX diagrams and internal/external loads for plant

Construction of ventilation devices, including throttles, filters, heating and cooling surfaces

Energy consumption for running ventilating plant Safety measures in ventilating plant, fire, smoke and frost Control and regulation theory Operations and maintenance procedures for ventilating plant, including measurement theory and adjustment

Workflow diagrams, functional descriptions and industrial systems

Knowledge

The students should have acquired knowledge about

- sounds in ventilating plant;
- changes of state of air;
- ventilation units with appurtenant automation;
- energy calculations; and
- new know-how in the area and be able to use new technologies.

Skills

The students should be able to

- plan and document a complete ventilating plant according to applicable regulations and considering functional, indoor-climate and operational requirements for finance, energy savings and environment;
- communicate their knowledge of the area to users, clients, architects, advisors and contractors with a view to giving advice, manage and plan the execution of works in the area; and
- prepare operation and maintenance procedures.

Competences

The students should be able to

- design and plan indoor climate/ventilating plant with accessory automation, in consideration of acoustics, adjustment and energy consumption;
- assess, advice on and make decisions in accordance with applicable laws, regulations and standards for indoor climate/ventilating plant; and
- contribute to influencing developments in the area so that focus will be on improved indoor climate, comfort and energy optimisation now and in future.

4.18 Heating (10 ECTS)

Contents

The heat loss and energy needs of buildings Heating systems, including producing, distributing and emitting systems, chimneys, pumps, regulation and insulation

Knowledge

The students should have acquired knowledge about

- the heat loss and energy needs of buildings; and
- dimensioning as well as establishment and handling of operations and maintenance of heating systems with appurtenant automation.

Skills

The students should be able to

- calculate and document the heat loss and energy needs of buildings;
- design and dimension heating systems;
- establish and handle operations and maintenance of heating systems with appurtenant automation; and
- assess installation forms and choose relevant and up-to-date solutions.

Competences

The students should be able to

- design and plan the execution of works on heating systems with appurtenant automation; and
- assess, advice on and make decisions in accordance with applicable laws, regulations and standards for heating systems with appurtenant automation.

4.19 Sanitation (10 ECTS)

Contents

Drains; Vented and unvented waste water installations, rainwater and drain water installations, pumping units, materials, corrosion, fire protection, noise

Water; Utility water installations, installation items, hot water cylinders, circulation, insulation, pressure boosting, water treatment, materials, corrosion, noise

Knowledge

The students should have acquired knowledge about

- dimensioning, establishment and handling of operation and maintenance of sanitary supply systems.

Skills

The students should be able to

- plan and dimension sanitary supply systems;
- establish and handle operation and maintenance of sanitary supply systems; and
- assess installation forms and choose relevant and up-to date solutions.

Competences

The students should be able to

- design and plan the execution of works on sanitary supply systems; and
- assess, advice on and make decisions in accordance with applicable laws, regulations and standards for sanitary supply systems.

4.20 Gas technology (1) (5 ECTS)

Contents

Installations at the ordinary consumer's as well as minor LPG gas installations

Knowledge

The students should have acquired knowledge about

- authority provisions and regulations, authorisations and certificates for gas technology systems;
- the properties and combustion of gas, gas supply systems, installations and components in earth and building;
- gas-consuming appliances and boilers, ventilation and flue systems; and
- dimensioning and establishment of gas technology systems with associate automation.

Skills

The students should be able to

- plan, dimension and establish common gas technology systems with associate automation; and
- assess installation forms and choose relevant, safety-related and up-to date solutions.

Competences

The students should be able to

- design and plan the execution of works on common gas technology systems with appurtenant automation; and
- assess, advice on and make decisions in accordance with applicable laws, regulations and standards for ordinary gas technology systems with appurtenant automation.

5. Number of exams in the compulsory educational components

The compulsory educational components of the 1st year of study are concluded with one common exam. The compulsory educational components of the 3rd semester are concluded with one common exam. See an overview of the study programme exams in chapter 8 "*Overview of exams*".

Relation between core areas and compulsory educational components:

Electrical power engineering	1st year of study	2nd year of study (3rd semester)	Total
Core areas	Compulsory educational components		
Installation technology	Linguistic communication (5 ECTS) Technical documentation (5 ECTS) Mathematics (5 ECTS) Information technology (5 ECTS)		20 ECTS
Business	Project management and works contract management (5 ECTS) Financial situation and business activities (5 ECTS)	Quality, safety and environment (5 ECTS) Organisation and management (5 ECTS)	20 ECTS
Technology and project design	Technical calculation (5 ECTS) Building installations (1) (15 ECTS) Building automation (5 ECTS) Automation for small machinery and plant (5 ECTS)	Building installations (2) (5 ECTS) Electricity supply systems (5 ECTS)	40 ECTS
	60 ECTS	20 ECTS	80 ECTS

Heating, water and sanitation	1st year of study	2nd year of study (3rd semester)	Total
Core areas	Compulsory educational components		
Installation technology	Linguistic communication (5 ECTS) Technical documentation (5 ECTS) Mathematics (5 ECTS) Information technology (5 ECTS)		20 ECTS
Business	Project management and works contract management (5 ECTS) Financial situation and business activities (5 ECTS)	Quality, safety and environment (5 ECTS) Organisation and Management (5 ECTS)	20 ECTS
Technology and project design	Technical calculation (5 ECTS) Indoor climate/ventilation (1) (5 ECTS) Heating (10 ECTS) Sanitation (10 ECTS)	Gas technology (1) (5 ECTS) Indoor climate/ventilation (2) (5 ECTS)	40 ECTS
	60 ECTS	20 ECTS	80 ECTS

6. Internship

6.1 ECTS credits

The internship is worth 15 ECTS credits.

6.2 Contents

During the internship, students work with professionally relevant issues and acquire knowledge of relevant job functions. The students will be working with one or more private or public companies during the internship.

As far as possible, the internship must be with a company within the professional field (such as consultancy, installation or energy optimisation) chosen by the students, in order to form the basis of a topic for the final exam project.

The internship must be completed according to the practises of the profession; contributing – together with the other components of the programme – to the students developing professional competences while acquiring knowledge of jobs that a service engineering graduate may find in a company.

6.3 Knowledge

The students should have acquired knowledge of

- the tasks related to the profession as well as methods, tools and instruments.

6.4 Skills

The students should be able to

- independently assess and undertake relevant, practical problems included in the learning agreement made with the internship company.

6.5 Competences

The students should be able to

- take a professional approach to dealing with relevant situations and problems in the selected specialisation.

The internship is concluded with one exam.

The learning outcomes for the educational component are identical to the learning outcomes for the examination.

See the institutional section of this Curriculum for exam form, exam procedure, etc.

7. Final exam project

7.1 ECTS credits

The final exam project is worth 10 ECTS credits.

7.2 Final exam project requirements

The final exam project examination is an external exam that, alongside the internship exam and the other exams of the programme, must document that the goals for the learning outcomes of the programme have been achieved.

The exam must document an understanding of practice and centrally applied methods in relation to a practice-based problem based on a specific assignment or project within the service engineering

field. The problem statement, which must be central to the profession, is formulated by the student, perhaps in collaboration with a company. The educational institution must approve the problem statement and research question.

The exam is made up of a project and an oral exam. One individual overall grade is given. The students will be assigned one or more institutional supervisors and may be assigned an external supervisor in connection with the preparation of the final exam project.

The final exam project may not exceed 45,000 characters including spaces. If two or more students prepare the final exam project together, the maximum number of characters is increased to 55,000 including spaces. The number of pages is exclusive of cover page, table of contents, graphics and reference list. Appendices are not part of the assessment.

7.3 Writing and spelling skills

Writing and spelling skills form part of the final exam project. The assessment is an expression of an overall assessment of the discipline-specific content as well as the students' writing and spelling skills. Students may apply for exemption from the requirement that writing and spelling skills form part of the assessment criteria if the application is supported by documentary evidence of a specific, relevant physical or mental impairment. The application is to be submitted to the study programme and directed to the attention of the programme director not later than four weeks before the exam is to be held.

7.4 Learning outcomes

The final exam project must substantiate that the students have reached the final level of the programme, cf. Annex 1 of Ministerial Order no. 791 of 20 August 2009 on the Academy Profession Degree Programme in Service Engineering: Goals for learning outcomes for the academy profession degree in service engineering.

7.5 Assessment

The examination is externally assessed and will be graded according to the 7-point grading scale. The exam is made up of a project and an oral examination. One individual overall grade is given. The exam cannot take place until the internship exam and the other exams of the study programme have been passed. See the institutional section of this Curriculum for exam form, exam procedure, etc.

8. Overview of exams

Overview of all examinations and their order:

Exam	105 ECTS credits distributed across exams	Assessment
1. 1st-year exam	60	7-point grading scale
2. 3rd-semester exam	20	7-point grading scale
3. Internship exam	15	7-point grading scale
4. Final exam project	10	7-point grading scale

Each exam project must be submitted electronically in PDF format as a single file to the educational institution conducting the examination. The educational institution conducting the examination will make sure that all external examiners will have access to the projects in question when they have been submitted.

9. Credit transfer

Passed educational components are equivalent to the corresponding educational components offered by other educational institutions that offer the programme.

The students must provide information on completed educational components from another Danish or international further education and on employment assumed to result in credit transfer. The educational institution will grant transfer credit in each individual case based on completed/passed educational components and occupations that match course units, parts of the study programme or parts of the internship. The decision is based on a professional assessment.

9.1 Pre-approved credit transfer

The students can apply for pre-approved credit transfer. Upon pre-approval of a study period in Denmark or abroad the students must, after conclusion of their study, document the completed educational components of the approved study. When applying for pre-approval, students must consent to allow the educational institution to collect any required information upon the students' completion of the study-abroad period.

For the final approval of pre-approved credit transfer, the educational component is considered completed if it is passed in accordance with the regulations applying to the study programme.

10. Exemption

The institution may grant exemption from the rules in this institutional section of the curriculum that are laid down solely by the institution, when found substantiated in exceptional circumstances. The educational institutions co-operate on a uniform exemption practice.

11. Effective date and transition regulations

This national section of the curriculum enters into force on 1 August 2014 with effect for all students who are and will be registered for the study programme on said date or thereafter.

The national section of the curriculum of September 2013 is revoked with effect from 31 July 2014. However, exams started before 1 August 2014 will be concluded according to this national section of the curriculum.

12. Institutional section

Curriculum – institutional section The Academy Profession Degree Programme in Service Engineering – Electrical Power Engineering

12.1 University College of Northern Denmark's organisation

University College of Northern Denmark (UCN) is the North Jutland educational institution for professional higher education. Technology and Business are the two schools for the technical and the business-related study programmes. The schools have shared premises at these addresses: Sofiendalsvej 60 and Hobrovej 85 in the city of Aalborg.

The service engineering programme is based at Sofiendalsvej.

12.2 Where to find the curriculum

The curriculum is available to students on eCampus.

Furthermore, the curriculum is available to all interested parties on UCN's website: www.ucn.dk

The Danish Ministry for Children, Education and Gender Equality, external examiners and relevant educational institutions will be notified of the curriculum and any changes made to it.

12.3 Course of the programme

The study programme is divided into 4 semesters, each with an overall theme. In each semester students work on interdisciplinary projects. The main contents of the projects are described later in this curriculum.

1. semester		2. semester		3. semester	4. semester	
Building installations and building automation		Industrial and technical installations		Electricity supply and installation optimisation	The electrical power engineering profession	
Project 1a: 1 dwelling	Project 1b: Block of flats and/or low-rise housing	Project 2a: Installations/ plant for commercial or institutional purposes	Project 2b: (1st-year exam) Installations/ plant for commercial or institutional purposes Project management and business activities	Project 3: Supply systems and installations Quality management. Organisation and management Elective	Internship	Final exam project Elective

12.4 Order of examinations by semester

Overview of all examinations and their order

Order	Exam		120 ECTS distributed across the exams	Assessment
1st semester	None			
2nd semester	1st-year exam Linguistic communication (5 ECTS) Technical documentation (5 ECTS) Mathematics (5 ECTS) Information technology (5 ECTS) Project management and works contract management (5 ECTS) Financial situation and business activities (5 ECTS) Technical calculation (5 ECTS) Building installations (1) (15 ECTS) Building automation (5 ECTS) Automation for small machinery and plant (5 ECTS)	Externally assessed	60	7-point grading scale
3rd semester	3rd-semester exam Quality, safety and environment (5 ECTS) Organisation and Management (5 ECTS) Building installations (2) (5 ECTS) Electricity supply systems (5 ECTS)	Internally assessed	20	7-point grading scale
3rd semester	Elective component examination 3.1	Internally assessed	5	7-point grading scale
3rd semester	Elective component examination 3.2 ¹	Internally assessed	5	7-point grading scale
4th semester	Internship exam	Internally assessed	15	7-point grading scale
4th semester	Elective component examination 4	Internally assessed	5	7-point grading scale
4th semester	Final exam project	Externally assessed	10	7-point grading scale

Information about the time and place for exams can be found on eCampus.

¹ Preparation for authorisation exam (Possibility for authorisation exam according to the guidelines of the Danish Safety Technology Authority)

12.5 Distribution of components

The compulsory educational components mentioned in the national section of this Curriculum are distributed across the four semesters as follows:

Service Engineering – Electrical power engineering	ECTS				Total
	1st sem.	2nd sem.	3rd sem.	4th sem.	
Distribution of components					
Basic service installation components	10	10			20
Linguistic communication	3	2			5
Technical documentation	2	3			5
Mathematics	3	2			5
Information technology	2	3			5
Business-related components	5	5	10		20
Project management and works contract management	2	3			5
Financial situation and business activities	3	2			5
Quality, safety and environment			5		5
Organisation and management			5		5
Technology and project design within electrical power engineering	15	15	10		40
Technical calculation	2	3			5
Electrical supply systems			5		5
Building installations (1)	8	7			15
Building installations (2)			5		5
Building automation	3	2			5
Automation for small machinery and plant	2	3			5
Elective educational components			10	5	15
Elective educational component 3.1			5		5
Elective educational component 3.2			5		5
Elective educational component 4				5	5
Internship				15	15
Final exam project				10	10
Total	30	30	30	30	120

12.6 Framework and criteria for the study programme exams

Definitions

Individual assessment is an assessment of an individual examinee's performance – all examinations always require individual assessment.

Independent assessment is an assessment of e.g. both the oral and the written presentation/a grade for the oral performance and a grade for the written performance.

Non-independent assessment is a total, cumulative assessment of e.g. the oral performance and the written performance.

Individual examination is defined as an examination of a single examinee – this means that the examinee will be the only examinee in the exam room – followed by assessment/grading.

Group examination is defined as a simultaneous examination of a group of examinees – this means that the examinees remain together during the examination – followed by assessment/grading.

Group assignment is a written or practical product made by a group of students.

Examination basis is the total amount of material that can be used to examine an examinee at a given examination.

Assessment basis is the examinee's performance at the examination.

In the Service Engineering programme, an overall assessment/grade will be given for the written and oral performances, and the written element makes up the examination basis. The written element must meet the requirements specified for the particular examination.

13. Theme/projects

13.1 The 1st-semester theme is building installations and building automation.

Objective

The objective of the projects in the 1st semester is to give students the opportunity to work in an interdisciplinary, continuous course of project planning in buildings with one or more storeys in accordance with current standards and regulations.

Students will achieve insight and experience in planning, designing, implementing, running, inspecting and maintaining electrical building installations as well as planning, designing and implementing building automation using technologies within intelligent building installations.

The students must be able to assess the installation potential and choose relevant solutions for the different installations in consideration of comfort and energy consumption.

Main contents

- Installation project which includes relevant documentation
- Minutes of meetings or other documentation of talks/agreements
- Description of the technical possibilities and assessment of the most suitable installations
- Analysis of the different types of possible installations
- Project planning and project management

Work form

The project works are executed according to a given building design.
The work is in the form of group work.

Project 1a will be made in the first half of the semester, based on a single-family dwelling.
Project 1b will be carried out in the second half of the 1st semester, based on a block of flats and/or low-rise housing.

A lecturer will provide guidance in the relevant specialist areas during the project work.

13.2 The theme of the 2nd semester is industrial and technical installations.

Objective

The objective of the projects in the 2nd semester is to give students the opportunity to work in an interdisciplinary, continuous course of project planning in industrial building in accordance with current standards and regulations.

Students will achieve insight and experience in planning, designing, implementing, running, inspecting and maintaining electrical building installations as well as planning, designing and implementing building automation using technologies within Intelligent Building Installations (IBI) and Building Management Systems (BMS).

Furthermore, students will gain an understanding of automatic and electrical installations used in small machinery and plant.

The students must be able to assess the installation potential and choose relevant solutions for the different installations in consideration of comfort and energy consumption as well as financial parameters.

Main contents

- Installation project which includes relevant documentation
- Minutes of meetings or other documentation of talks/agreements
- Description of the technical possibilities and assessment of the most suitable installations
- Project planning and project management
- Drawing up of financial calculation for selected parts of the project
- Financial consequences for own company

Work form

The project works are executed according to a given building design.

The work is in the form of group work.

Project 2a will be made in the first half of the semester, based on an industrial or institutional building.

Project 2b (1st-year exam) will be made in the second half of the semester, also based on an industrial or institutional building.

A lecturer will provide guidance in the relevant specialist areas during the project work.

1st-year examination

The 1st-year examination covers the examination in the following compulsory educational components:

- Linguistic communication (5 ECTS)
- Technical documentation (5 ECTS)
- Mathematics (5 ECTS)
- Information technology (5 ECTS)
- Project management and works contract management (5 ECTS)
- Financial situation and business activities (5 ECTS)
- Technical calculation (5 ECTS)
- Building installations (1) (15 ECTS)
- Building automation (5 ECTS)
- Automation for small machinery and plant (5 ECTS)

Examination prerequisites, including obligation to participate

Students must meet the following requirements in order to sit the exam:

- Approved participation in project 1a
- Approved participation in project 1b
- Approved participation in project 2a

For each project learning period, students must prepare and submit a report and an oral project presentation must be made. The written project must satisfy the formal requirements, see below, and be submitted in due time, cf. schedule on eCampus, and the students must take part in the oral presentation.

Non-performance of one or more of the described examination prerequisites or incorrect submission of the written projects means that students cannot sit the exam and that they will be considered to have made an exam attempt.

Formal written project requirements

Students must write a report.

The report must include:

- A cover page with title and names of the group members, class, date, year and UCN
- Optional title page
- Table of contents including a list of the students who were responsible for the individual sections of the report

- Abstract/synopsis
- Introduction, including presentation of problem statement, research question(s), limitation of scope and approaches
- Background, methods, analysis, including descriptions of and arguments for the choice of the equipment and technologies used
- Conclusion (remember that the introduction and the conclusion must relate to each other). In principle, it should be possible to understand the introduction and conclusion without reading the background and analysis chapters)
- Reference list (including all sources referred to in the project)

The minimum required length of each report is as follows:

For students who work alone, the report length must be between 45,000 and 55,000 characters plus appendices.

For groups of two students, the report length must be between 55,000 and 65,000 characters plus appendices.

For groups of three students, the report length be between 65,000 and 75,000 characters plus appendices.

For groups of four students, the report length must be between 75,000 and 85,000 characters plus appendices.

A standard page is 2,400 characters including spaces and footnotes. The pages are exclusive of cover page, title page, table of contents and reference list.

The report and any appendices must be submitted as a single PDF file.

Rules and description of the oral presentation of the project report

The group must present the written project report.

The group must have 1-4 students.

There will be ten minutes for the presentation plus 15-20 minutes per group member for a discussion and questions to the presentation including responses from the supervisors.

(For groups of two persons, exam duration is thus 60 minutes; for groups of three persons 90 minutes; and for groups of four persons 120 minutes.)

Examination procedure

The exam is an externally assessed, individual, oral examination based on a written group project, and it is graded according to the 7-point grading scale. Students will receive a single, total grade.

A group must have 1-4 students.

There will be ten minutes for the presentation plus 15-20 minutes per group member for questioning including a response.

(For groups of two persons, exam duration is thus 60 minutes; for groups of three persons 90 minutes; and for groups of four persons 120 minutes.)

The exam is worth 60 ECTS credits.

Assessment criteria

The assessment criteria for the examination are identical to the learning outcomes for the compulsory educational components in the 1st and 2nd semesters.

The learning outcomes are described in the national section of this Curriculum.

Scheduled time

The exam will take place in the 2nd semester. Further information about time and place as well as submission of the written project can be found on eCampus.

Examination language

Danish.

The exam must be passed with a grade of at least 02 before the start of the 2nd year of study in order for students to continue their study.

UCN may exempt individual students from the deadlines that have been set for passing the examination if the exemption is due to illness, maternity or paternity leave or exceptional circumstances.

13.3 The 3rd-semester theme is electricity supply and installation optimisation.

Objective

The objective of the project in the 3rd semester is to give students the opportunity to work in an interdisciplinary, continuous course of project planning in a company in accordance with current norms and regulations.

Students will achieve insight and experience in planning, designing, implementing, running, inspecting and maintaining electrical building installations and electricity supply systems.

The students must be able to assess the potential of the different solutions in consideration of energy consumption and financial parameters.

The students will achieve insight and experience in quality, safety, environment, organisation and management.

Main contents

- A project which includes relevant documentation
- Minutes of meetings or other documentation of talks/agreements
- Description of the technical possibilities and assessment of the most suitable installations
- Description of the business potential and assessment of the solutions.
- Quality, safety and environment
- Organisation and management

3rd-semester exam

The 3rd-semester exam comprises the examination of the following compulsory educational components:

- Quality, safety and environment (5 ECTS)
- Organisation and Management (5 ECTS)
- Building installations (2) (5 ECTS)
- Electricity supply systems (5 ECTS)

Examination procedure

The exam is an internally assessed, individual oral examination based on a written group project, and it is graded according to the 7-point grading scale. Students will receive a single, total grade.

The exam is worth 20 ECTS credits.

A group must have 1-4 students.

Formal written project requirements

The students must write a report.

The report must include:

- A cover page with title and names of the group members, class, date, year and UCN
- Optional title page
- Table of contents including a list of the students who were responsible for the individual sections of the report
- Abstract/synopsis
- Introduction including presentation of problem statement, research question(s), limitation of scope and approaches
- Background, methods, analysis, including descriptions of and arguments for the choice of the equipment and technologies used
- Conclusion (remember that the introduction and the conclusion must relate to each other). In principle, it should be possible to understand the introduction and conclusion without reading the background and analysis chapters)
- Reference list (including all sources referred to in the project)

The minimum required length of each report is as follows:

For students who work alone, the report length must be between 45,000 and 55,000 characters plus appendices.

For teams of two students, the report length must be between 55,000 and 65,000 characters plus appendices.

For teams of three students, the report length be between 65,000 and 75,000 characters plus appendices.

For teams of four students, the report length must be between 75,000 and 85,000 characters plus appendices.

A standard page is 2,400 characters including spaces and footnotes. The pages are exclusive of cover page, title page, table of contents and reference list.

The report and any appendices must be submitted as a single PDF file.

Rules and description of the oral presentation of the project report

The group must present the written project report.

The group must have 1-4 students.

There will be ten minutes for the presentation plus 15-20 minutes per group member for a discussion and questions to the presentation including responses from the supervisors.

(For groups of two persons, exam duration is thus 60 minutes; for groups of three persons 90 minutes; and for groups of four persons 120 minutes.)

Assessment criteria

The assessment criteria for the examination are identical to the learning outcomes for the compulsory educational components for the 3rd semester.

The learning outcomes are described in the national section of this Curriculum.

Scheduled time

The exam will take place in the 3rd semester. Further information about time and place as well as submission of the written project can be found on eCampus.

Examination language

Danish.

UCN may exempt individual students from the deadlines that have been set for passing the examination if the exemption is due to illness, maternity or paternity leave or exceptional circumstances.

14. Compulsory educational components 3.1 and 3.2

Contents

The elective educational components give the student the opportunity to qualify study-related and professional competences through specialisation and elaboration on subjects that are broadly related to the electricity field.

Each year at least two electives will be offered. Their descriptions are found on eCampus.

The students may plan their elective educational components themselves as a theoretical and/or practical programme to be approved by the study programme.

Learning outcomes

Knowledge

The students should be able to

- understand and reflect on the theory and practice of the selected topic(s); and
- describe and explain the relevance of the selected topic(s) to the theory and practices of the electricity profession.

Skills

The students should be able to

- select, describe and perform literature search for an issue pertaining to the electricity field;
- discuss process-related and analytical skills related to the selected topic(s);
- assess problems and suggest possible solutions for the selected topic(s); and
- communicate central results.

Competences

The students should be able to

- independently acquaint themselves with new topics within the theory or practice of the subject field; and
- elaborate on and relate the chosen topic(s) to the other subject fields of the study programme.

Examinations for compulsory educational components 3.1 and 3.2

The examination includes the examination in elective educational component no. 3.1.

The examination includes the examination in elective educational component no. 3.2

Formal written project requirements

Students must write a report.

The report must include:

- Cover page with title and name, class, date, year and UCN.
- Optional title page
- Table of contents
- Introduction including a presentation of the problem statement, research question(s) and approaches
- Background, methods, analysis, including descriptions of and arguments for the choice of the equipment and technologies used
- Conclusion (remember that the introduction and the conclusion must relate to each other). In principle, it should be possible to understand the introduction and conclusion without reading the background and analysis chapters)
- Reference list (including all sources referred to in the project)

The minimum required length of each report is as follows:

Students must work alone, and the report length must be a minimum of 10,000 and a maximum of 24,000 characters plus appendices.

A standard page is 2,400 characters including spaces and footnotes. The pages are exclusive of cover page, title page, table of contents and reference list.

The report and any appendices must be submitted as a single PDF file.

Examination procedure

The exam is an internally assessed, individual, written examination based on a written report, and it is graded according to the 7-point grading scale. Students will receive a single, total grade.

The examination is worth 5 ECTS credits per elective educational component.

Assessment criteria

The assessment criteria for the examination are identical to the learning outcomes for the elective educational components in the 2nd year of study.

The learning outcomes can be found in the institutional section of the curriculum.

Scheduled time

The exam will take place in the 3rd semester. Further information about time and place as well as submission of the written project can be found on eCampus.

Examination language

Danish.

UCN may exempt individual students from the deadlines that have been set for passing the examination if the exemption is due to illness, maternity or paternity leave or exceptional circumstances.

15. The 4th-semester theme is the electrical power engineering profession

The semester comprises internship, elective and a final exam project.

Objective

During the internship, students must work with issues relevant to the profession and achieve knowledge of relevant job functions that electrical power engineering graduates perform.

The students must test their knowledge of an electrical power engineer's tasks, work methods and tools.

The students must further independently assess and conduct relevant installation tasks. Finally, the students must be able to handle relevant situations and issues in a professional way in respect of the installation area.

15.1 The internship

Internship requirements and expectations

During the internship, the students will work on discipline-specific issues within the core areas of the study programme and achieve knowledge of relevant business functions. The students will be associated with one

or more companies during the internship. The internship may be organised in a flexible and personalised manner and may form the basis of the students' final exam project.

Based on the internship's learning outcomes, see the national section of this Curriculum, the student and the supervisor/contact person will collaborate on setting specific objectives for the student's internship. The objectives must be written down.

These goals will determine the planning of the students' internship tasks and work. The internship should be considered similar to a full-time job with the same requirements for working hours, effort, commitment and flexibility that graduates can expect to meet in their first job.

Examination prerequisites

The students must meet the following requirements in order to sit the exam:

- The requirements of the Internship Portal must be met, e.g. filling in the internship contract, learning outcomes, log book etc.
- The written report that makes up the assessment and examination basis must meet the formal requirements stated below; and be submitted in due time according to the exam plan, which can be found on eCampus.

Non-performance of one or more of the described examination prerequisites or incorrect submission of the written report means that a student cannot sit the exam and that they will be considered to have made an exam attempt.

Formal requirements for the written internship report

The report must include:

- Cover page with title
- Table of contents
- Abstract/synopsis
- Learning outcomes defined in the Internship Portal
- Reflections on the learning outcomes
- Discussion of positive and negative experiences from the internship
- Conclusion on the accomplishment of the learning outcomes
- Appendices (include only appendices central to the report)

The length of the project must be between 10.000 and 24.000 characters.

A standard page is 2,400 characters including spaces and footnotes. The pages are exclusive of cover page, table of contents and appendices.

Examination procedure

Individual, internally assessed written report. Assessed according to the 7-point grading scale. The exam is worth 15 ECTS credits.

Assessment criteria

The assessment criteria for the examination are identical to the learning outcomes for the internship. The learning outcomes are described in the national section of this Curriculum.

Scheduled time

The exam will take place in the 4th semester. Information about time and place can be found on eCampus.

Examination language

Danish.

UCN may exempt individual students from the deadlines that have been set for passing the examination if the exemption is due to illness, maternity or paternity leave or exceptional circumstances.

15.2 Final exam project

For a description of the final exam project requirements and learning outcomes, please see the national section of this Curriculum.

Exam attendance prerequisites, including obligation to participate

The following requirements, including the obligation to participate, must be met in order for students to sit the examination:

- The 1st-year examination must have been approved and have achieved at least the grade 02.
- The 3rd-semester examination must have been approved and have achieved at least the grade 02.
- Elective educational component 3.1 must have been approved and have achieved at least the grade 02.
- Elective educational component 3.2 must have been approved and have achieved at least the grade 02.
- The internship examination must have been approved and have achieved at least the grade 02.

The written project which makes up both the assessment and examination basis must meet the formal requirements for the final exam project, see the national section of this Curriculum, and be submitted in due time, see the exam schedule on eCampus.

Non-performance of one or more of the described examination prerequisites or incorrect submission of the written projects means that students cannot sit the exam and that they will be considered to have made an exam attempt.

Examination procedure

The exam is an externally assessed oral examination based on a written project. The written and oral performances are assessed as a whole, leading to a single grade. The examination is assessed and graded according to the 7-point grading scale.

The group may have up to four members.

The following number of minutes are allowed for the examination, including time for deliberations, depending on the number of students in the group:

- Students who work alone: 50 minutes, presentation time: 20 minutes
- Groups of two students: 100 minutes
- Groups of three students: 150 minutes
- Groups of four students: 200 minutes

The exam is worth 10 ECTS credits.

Assessment criteria

The assessment criteria for the exam are the same as the learning outcomes for the final exam project, see the national section of this Curriculum.

Scheduled time

The exam will take place at the end of the 4th semester. Information about time and place can be found on eCampus.

Examination language

Danish.

The project must be based on central issues contained in the various educational components and the students' elective educational components.

16. Educational components that may take place abroad

Each of the educational components of the study programme may take place abroad if the student applies for and is granted pre-approval of credit transfer by the study programme.

In cases of pre-approved credit transfer, students are under a duty to document completion of the pre-approved learning outcomes for each of the educational components, upon completion of the study-abroad period. When applying for pre-approval, students must consent to allow the educational institution to collect any required information upon the students' completion of the study-abroad period.

For the final approval of pre-approved credit transfer, the educational component is considered completed if it is passed in accordance with the regulations applying to the study programme.

17. Learning and teaching forms

In the Service Engineering programme we use a wide range of teaching and learning methods that combined support the student in achieving the learning outcomes described in this curriculum.

The learning and teaching methods are based on UCN Technology's common learning/teaching approach and on the Blue Model. The learning approach is based on the PULSE philosophy about "The Whole Person" which describes the learning outcome as three dimensional, namely:

- Head: "Knowledge, reflection and the ability to generate ideas"
- Heart: "Personal insight and development, relations and co-operation"
- Legs: "Initiative and responsibility"

The general learning and teaching methods are dialogue-based class tuition, assignments and project work in groups. However, the programme also features many other activities such as study group work, self study, individual assignments and projects, presentations in front of groups and the whole class, interdisciplinary theme activities and much more.

Common to all these activities is that we always try to define (or help you define) clear goals for the learning activities.

Furthermore, different activities that can help promote learning in the individual are offered: Theme days, after-hours meetings, lectures by external speakers, field trips etc.

18. Credit transfer for elective educational components

Passed elective educational components are equivalent to the corresponding educational components offered by other providers of this study programme as well as to educational components of other study programmes.

Pre-approved credit transfer can be applied for if credit is requested for educational components not offered by the programme.

19. Obligation to participate

For the learning and teaching methods of the programme to work as intended, students are under an obligation to participate, which includes an obligation to submit or present assignments and projects.

The obligation to participate may also be a prerequisite for exam participation. Furthermore, some programme elements may impose an obligation to attend.

An obligation to participate and an obligation to attend, if any, that are prerequisites of participating in exams, will appear from the description of the individual exam.

20. Criteria for assessing study activity

Registration may be terminated for students who have not complied with the study activity requirements for a continuous period of at least one year.

Study activity is defined as the following requirements: within the past 12 months students must have

- participated in at least two different exams;
- passed at least one exam;
- fulfilled the obligations to participate in any kind of activity that is part of the study programme, including group projects, joint projects, distance learning activities etc. as described in this Curriculum;
- submitted the assignments, reports, portfolios etc. that are prerequisites for exam participation as described in the curriculum, the coursework being academically honest and not including material that is the copyright of others; and
- attended activities to which an obligation to attend applies as stated in this Curriculum.

Non-compliance with one or more criteria in the definition of 'study activity' may be the grounds of termination of registration as a student.

Periods in which the student has not been participating actively in studies due to leave of absence, maternity leave, adoption of a child, verified illness or military service do not count against the period of 12 months required for participating actively in studies. On request, the students must provide documentation of such matters.

The study programme may grant exemption from these stipulations in exceptional circumstances. The application for exemption should be submitted to the programme director.

Students will be informed in writing before their student registration is terminated. In connection with such notification, students will be made aware of the above rules. In the letter, students must be informed that they will have 14 days to submit documentary evidence to prove that periods during which they were not participating should not count as non-compliance with study activity requirements. Furthermore, students will be notified of the deadline for making an appeal for exemption.

If the student has not responded within the fixed deadline, his/her registration as a student will be terminated.

If the student requests that registration is not terminated, the procedure will be suspended until the programme director has decided the case.

Students may make a complaint to the programme director about the decision within two weeks of receipt of the decision. The complaint will suspend proceedings. If the programme director maintains the decision, the student may appeal to the Ministry of Higher Education and Science within two weeks of receipt of the decision, but only in respect of legal matters.

The rules about the exams that the student must have participated in before the end of the 1st year of study and passed before the end of the 2nd year of study according to the curriculum, and the deadlines for com-

pletion of the education stated in the ministerial order for the study programme, remain in force regardless of the stipulations in this Curriculum.

21. Language

Most of the teaching materials are in Danish/English, and parts of the tuition may be in English.

The students' English skills must meet the requirements of the Ministerial Order on admission to academy profession degree programmes and professional bachelor's degree programmes (the Admission Order). Students are not required to have any knowledge of foreign languages other than that stated in the Admission Order.

Examination language

Exams must be conducted in understandable Danish/English.

Students whose mother tongue is not Danish may apply for an exemption from the requirement that writing and spelling skills must form part of the assessment criteria for the final exam project. The application must be submitted to the programme not later than four weeks before the exam is to take place.

22. Resit and illness resit exams

Illness resits

Students who were prevented from attending an exam owing to verified illness or other unforeseen reason will be able to resit the (illness resit) exam as soon as possible. If the exam takes place in the final exam term, the student will have the opportunity to sit the exam in that exam term or immediately after the term.

The illness resit may be identical with the next ordinary exam. It is the student's responsibility to stay informed on when (illness) resit exams will be held.

Information about time and place for each illness resit can be found on eCampus.

Illness must be verified by medical certificate. The educational institution must receive the medical certificate within three working days after the exam was held. Students who suffer from acute illness during an exam must substantiate that they have been ill on the day in question.

If illness is not verified according to the above rules, the students will be considered to have made an exam attempt.

It is the students' responsibility to cover the expense of a medical certificate.

Resits

Where the students have failed or not attended an exam, they are automatically registered for a resit, as long as exam attempts remain. The resit exam may be identical to the next ordinary exam.

It is the students' responsibility to stay informed on when resits will be held.

Information about time and place for each resit exam can be found on eCampus.

The programme can grant exemption from continued registration when this is founded in exceptional circumstances, including documented disability.

23. Study aids

Any rules governing restriction of the use of study aids will appear from the description of the individual exam.

24. Special exam arrangements

Students may apply for special exam arrangements if their medical condition or relevant specific disabilities qualify them to do so. The application must be submitted to the programme not later than four weeks before the exam is to take place. The application deadline may be extended in cases of sudden health-related problems. With the application the following should be enclosed: a medical certificate; a statement from e.g. a speech, hearing, dyslexia or blind institute; or other evidence of the health condition or relevant specific functional impairment.

Students whose mother tongue is not English may apply for permission to bring dictionaries to exams.

Applications for permission to bring other study aids must be submitted to the programme not later than four weeks before the exam is to be held.

25. Academic misconduct at exams

When handing in a written exam assignment, the student must confirm by signature that the assignment was prepared without undue help.

Use of your own and others' work – plagiarism

Academic misconduct at exams in the form of plagiarism are instances where a written assignment, in full or in part, appears to have been made by the student or students themselves, even though the assignment

1. includes identical or near-identical wording of other people's statements or works where the text is not set off by the use of quotation marks, italics, indentation or any other clear indication with a reference to the source, cf. UCN's requirements to written work;
2. includes substantial sections of text that are so similar to another work in wording etc. that by comparison it is clear that the sections could not have been written without the use of the other work;
3. includes the use of other's words or ideas without giving due credit to the sources;

4. re-uses text and/or central ideas from your own previously assessed works without observing the stipulations in sections 1 and 3.

Disciplinary actions in events of academic misconduct and disruptive behaviour

An examinee who, undoubtedly

- unduly obtains help, or
- helps another student do an assignment, or
- uses non-authorised aids

and an examinee who behaves in a disruptive manner

at an exam may be expelled from the exam room while the exam is taking place by the programme director, a person authorised by the director, or jointly by the assessors. In such cases, the justification of the expulsion from the exam room will be assessed in connection with the subsequent decision on the sanctions to be imposed.

In cases of less serious disturbing behaviour, the students will first be given a warning.

Suspected academic misconduct at exams including plagiarism, during and after the exam

If, during or after an exam, suspicion arises that an examinee

- has obtained or provided undue help,
- has passed off another person's work as their own (plagiarism), or
- has used his/her own previously assessed work or parts of it without reference (plagiarism);
- this will be reported to the relevant programme.

The process of identifying academic misconduct including plagiarism

Suspension of the exam

If the reported misconduct regards plagiarism in a written assignment that is to make up the basis of assessment for a subsequent oral exam, the programme director will suspend the exam if the matter cannot be settled before the fixed examination date.

Form and contents of the report

Misconduct must be reported without undue delay. The report must include a written presentation of the case with information to identify the reported persons, as well as a brief account of the matter and the existing evidence. Previous incidents of academic misconduct by one or more of the reported students must be stated explicitly.

When plagiarism is reported, the plagiarised sections must be clearly indicated and a reference to their sources stated. The copied text must also be indicated in the source text.

Involving the examinee – hearing of the parties

The programme director decides whether the hearing of the students will be oral, made in writing or a combination.

For an oral hearing, the examinee will be summoned for a discussion to clarify the case where they will be presented with the documentation of the suspected academic misconduct and where they will be able to state their point of view. The examinee has a right to bring a companion.

For a written hearing, the documentation of suspected academic misconduct will be sent to the students requesting them to state their point of view in writing.

Sanctions against academic misconduct and disruptive behaviour during exams

If the suspected misconduct is confirmed after the matter has been investigated, and if the misconduct has had or may be having an influence on the assessment of the examinee's performance, the programme director will suspend the examinee from the exam.

In less serious cases, the examinee will first be given a warning.

In aggravating circumstances, the programme director may suspend the examinee for a period of time. In such cases, the examinee will receive a written warning that any further instances of misconduct may lead to expulsion.

A period of suspension means that any grades awarded for the exam in question will be annulled, and that they will be considered to have made an exam attempt.

The examinee will not be allowed to resit the exam and will have to wait until the next ordinary exam in that particular programme is offered.

In cases of aggravating circumstances, the programme director may decide to suspend the examinee from the institution for a period of time. In such cases, the examinee will receive a written warning that repeated instances of academic misconduct may lead to expulsion.

The students cannot attend lectures or exams while suspended.

Complaints

The decision that a student is suspended and has used an exam attempt is final and cannot be brought before a higher administrative authority.

Complaints on the grounds of legal matters (e.g. legal incapacity, the hearing procedure, guidelines on making complaints, correct interpretation of the Exam Order, etc.) may be brought before the Danish Agency for Higher Education. The complaint must be brought before the institution and directed to the attention of the relevant programme director who will make a statement. The complainant will have the opportunity to comment on the statement, the deadline being usually one week. The institution will submit the complaint, the statement and any comments made by the complainant to the Danish Agency for Higher Education. The deadline for complaints made to the institution is two weeks from the day the complainant was notified of the decision, see section 51 of the Exam Order.

26. Complaints about exams and appeals against decisions

Complaints about exams

The examinee is recommended to seek guidance from the student advisor in connection with the complaints procedure and writing a complaint.

The regulations on complaints about exams can be found in section 10 of the Exam Order.

The Exam Order divides complaints into two kinds:

1. Complaints about the examination basis etc., the course of the exam and/or the assessment
2. Complaints on the grounds of legal irregularities

The two kinds of complaints are dealt with differently.

Complaints about the examination basis etc., the course of the exam and the assessment

Within two weeks after the assessment of the exam has been announced in the usual way, an examinee may submit a written, substantiated complaint about

1. the exam basis including the exam questions, assignments etc. and its connection to the purpose and requirements of the programme;
2. the examination procedure;
3. the assessment.

The complaint may concern any exam including written examinations, oral examinations and combined exams as well as practical, clinical or laboratory exams.

The complaint should be submitted to the programme director.

The complaint will immediately be brought before the original assessors, i.e. the examiner and the external examiner from the exam in question. The statement made by the assessors must be usable as the basis of the institution's decision regarding discipline-specific matters. The institution will usually give the assessors a deadline of two weeks to make their statements.

Immediately after the statements are made available, the complainant will be given the opportunity to comment on them within, usually, one week.

The decision will be made by the institution based on the discipline-specific statements made by the assessors and any comments made by the complainant.

The decision must be made in writing and must include a rationale. It may regard

1. an offer of a new assessment (re-assessment). This only applies to written examinations;
2. an offer of a new examination (resit);
3. a dismissal of the complaint.

If it is decided that the student will be offered re-assessment or a resit exam, the programme director will appoint new assessors. Re-assessment may only be offered in cases of written exams where written material exists for assessment, as new assessors will not be able to (re-)assess an already held oral exam, and as the notes of the original assessors are personal and cannot be passed on to others.

If the decision is to offer the complainant a re-assessment or resit exam, the complainant must be notified that a re-assessment or a resit exam may result in a lower grade. The complainant must accept the offer within two weeks of the announcement of the decision. Acceptance of an offer of re-assessment or a resit exam cannot be cancelled. If the appellant does not accept the offer within the deadline, re-assessment or a resit exam will not be carried out.

Re-assessment or a resit exam must take place as soon as possible.

For re-assessment, the assessors must be presented with the case documents: the exam paper, the students' assignment, the complaint, the statements made by the original assessors with the comments made by the complainant, and the decision made by the institution.

The assessors will deliver the result of the re-assessment including a written explanation and their assessment to the educational institution. Resit exams and re-assessments may result in lower grades than the initial grades.

If it is decided that a re-assessment or resit exam will be offered, the decision will apply to all examinees who took the exam in question, if their assignment features the same deficiency as the one being complained about.

The complaint must be submitted to the programme director not later than two weeks (14 calendar days) after the assessment results of the exam in question have been announced. If the deadline falls on a holiday, the deadline will be extended to expire on the first weekday after that day.

In exceptional circumstances, the deadline may be disregarded.

Appeals

The appellant may bring the institution's decision on academic/professional matters before an appeals board. The activities of the appeals board fall under the Danish Public Administration Act, including the stipulations on legal incapacity and the duty of confidentiality.

The appeal is to be submitted to the programme director.

The deadline for appeals is two weeks after the examinee has been notified of the decision. The above requirements for complaints (being in writing, substantiated etc.) also apply to appeals.

The appeals board is made up of two appointed external examiners who will be appointed by the chairman of the external examiners, one examiner and a student within the same field (from the study programme) both appointed by the programme director.

The appeals board will make a decision based on the material that formed the basis of the institution's decision and the examinee's substantiated appeal.

The appeals board will process the appeal, and the decision may concern

1. an offer of a new assessment (re-assessment) made by new assessors. (Only applicable to written examinations);
2. an offer of a new examination (resit) by new assessors;
3. a dismissal of the appeal.

If the decision is to offer the appellant a re-assessment or resit exam, the appellant must be notified that a re-assessment or a resit exam may result in a lower grade. The appellant must accept the offer within two weeks of the announcement of the decision. Acceptance of an offer of re-assessment or a resit exam cannot be cancelled.

If the appellant does not accept the offer within the deadline, re-assessment or a resit exam will not be carried out.

Re-assessment or a resit exam must take place as soon as possible.

For re-assessment, the assessors must be presented with the case documents: the exam paper, the students' assignment, the complaint, the statements made by the original assessors with the comments made by the complainant, and the decision made by the institution.

The appeals board must have made a decision within two months – and within three months for summer exams – after the appeal was made.

The decision of the appeals board is final meaning that the case cannot be brought before a higher administrative authority regarding the parts of the appeal that concern discipline-specific matters.

Complaints about legal matters

Complaints on the grounds of legal matters in decisions made by the assessors in connection with re-assessment or resit exams or the appeals board's decisions may be brought before University College of Northern Denmark within two weeks of the day the complainant was notified of the decision.

Complaints on the grounds of legal matters in decisions that were made by the institution according to the provisions of the Exam Order (legal incapacity, the hearing procedure, correct interpretation of the Exam Order etc.) may be brought before the educational institution. The educational institution will make a statement, and the complainant must be given the opportunity to comment on this statement, the deadline for such comment being usually one week. The institution will submit the complaint, the statement and any comments made by the complainant to the Danish Agency for Higher Education. The institution will submit the complaint, the statement and any comments made by the complainant to the Danish Agency for Higher Education. The deadline for lodging complaints with the institution is two weeks (14 days) from the day the complainant was notified of the decision.

27. Exemption

The institution may grant exemption from the rules in this institutional section of the curriculum that are laid down solely by the institution, when found substantiated in exceptional circumstances. The educational institutions co-operate on a uniform exemption practice.

28. Other regulations

Admission requirements, registration, enrolment, leave of absence

In order to be enrolled on the Service Engineering – Electrical Power Engineering programme, applicants must meet the admission requirements.

Admission with vocational education and training (VET):

automation and process (automatik- og procesuddannelsen) (with specialities)
electrician, building automation
electrician, installation technology
electrician, communication technology
electrician, control and regulation technology
electronics and low-voltage

Admission with other relevant vocational or technical educations:

Specific entry requirement: mathematics C

Enrolment

All students will enrol and be registered for the study programme in Aalborg at University College of Northern Denmark, Technology and Business.

All applicants who meet the admission requirements can enrol.

Any doubts about an applicant's entitlement to enrol will be decided by UCN in accordance with the regulations of the Ministerial Order on access, enrolment and leave etc. on certain higher education programmes (Bekendtgørelse om adgang, indskrivning og orlov m.m. ved visse videregående uddannelser).

The student advisor will deal with all matters concerning admission and will normally seek to clarify any questions regarding the admission through a talk with the applicant.

Leave of absence

It is possible to take a leave of absence from the programme. However, the programme must be concluded within four years from study start.

29. Effective date and transition provisions

This institutional section of the curriculum enters into force on 2 February 2015 with effect for all students who are and will be registered in the programme and for all exams commenced on said date or thereafter.

The national section of the curriculum from the spring of 2013 is revoked with effect from 3 February 2015. However, any examinations commenced before 2 February 2015 shall be concluded according to the national section of the curriculum not later than 2 February 2015 with the addition of two semesters.

Students who started before 2 February 2015 will complete the 3rd and 4th semester according to the curriculum from the spring of 2013; however not later than January 2016.

30. Legal basis for the study programme

The programme is governed by the following acts and regulations:

- Act on academy profession programmes and professional bachelor programmes (Danish title: Lov om erhvervsakademiuddannelser og professionsbacheloruddannelser): Act no. 1147 of 23 October 2014

- Ministerial Order no. 1521 of 16 December 2013 on Academy Profession Programmes and Professional Bachelor Programmes. (Danish title: Bekendtgørelse om erhvervsakademiuddannelser og professionsbacheloruddannelser) (This Order exists in an English translation here: <http://ufm.dk/en/legislation/prevaling-laws-and-regulations/education/academy-profession-study-programmes>)
- Ministerial Order no. 791 of 20 August 2009 on the Academy Profession Degree Programme in Service Engineering. (Danish title: Bekendtgørelse om erhvervsakademiuddannelse inden for energianlæg) (Danish title: Bekendtgørelse om energianlæg)
- Ministerial Order on admission to and enrolment on academy profession and professional bachelor programmes (the Admission Order) (Danish title: Bekendtgørelse om adgang til erhvervsakademiuddannelser og professionsbacheloruddannelser) Ministerial Order no. 223 of 11 March 2014.
- Ministerial Order on examinations on professionally oriented higher education programmes (the Exam Order) (Danish title: Bekendtgørelse om prøver i erhvervsrettede videregående uddannelser) Ministerial Order no. 1519 of 16 December 2013.
- Ministerial Order on the grading scale and other forms of assessment (Danish title: Bekendtgørelse om karakterskala og anden bedømmelse). Ministerial Order no. 262 of 20 March 2007.
- Ministerial Order on accreditation of higher education institutions and approval of new higher education programmes (Danish title: Bekendtgørelse om akkreditering af videregående uddannelsesinstitutioner og godkendelse af nye videregående uddannelser) Ministerial Order no. 745 of 24 June 2013.
- Ministerial order on open education (profession-oriented adult education) etc. (Danish title: Bekendtgørelse af lov om åben uddannelse (erhvervsrettet voksenuddannelse) m.v.) Consolidating act no. 374 of 4 April 2014.
- Ministerial order on authorisation and operation of a business in the heating, water and sanitation as well as the sewer installation area (Danish title: Bekendtgørelse om autorisation og drift af virksomhed på el-, vvs- og kloakinstallationsområdet): Ministerial Order no. 547 of 30 May 2014.
- The Acts and Ministerial Orders are available (in Danish) on the official website for Danish legislation: www.retsinfo.dk