OCCUPATIONAL QUALIFICATION STANDARD

Chartered Electrical Engineer, EstQF Level 8

An occupational qualification standard is a document which describes the set of skills, knowledge and attitudes, i.e. competence requirements, needed to successfully accomplish duties. Occupational qualification standards are used for compiling curricula and awarding qualifications.

Occupational title	Level of Estonian Qualifications Framework (EstQF)
Chartered Electrical Engineer, EstQF Level 8	8

Possible specialisation and titles on occupational certificate	
Specialisation	**Title on occupational qualification certificate**
Electrical networks and systems	Chartered Electrical Engineer of Electrical Systems and Networks, EstQF Level 8
Electric automation	Chartered Electrical Engineer of Electric Automation, EstQF Level 8
Consumer electrical installations	Chartered Electrical Engineer of Consumer Electrical Installations, EstQF Level 8

Part A
DESCRIPTION OF WORK

A.1 Description of work

It is the job of electrical engineers to ensure the effective, safe, environmentally friendly and both economically and socially acceptable functioning of electrical systems and equipment.
Chartered Electrical Engineer, Level 8 is a senior specialist with widespread experience whose role is to maintain and develop existing technologies and invent new types.
As a leader, they are responsible for the strategic activities of a unit or organisation. They are prepared to work in a team with engineers and specialists from connected fields.
The work entails independent activity, which demands mastery in complex, undefined situations that may require new strategic approaches.

Chartered electrical engineers specialise in:
- electrical networks and systems (transmission and distribution systems, larger electrical power plants and large-scale consumers with transmission systems);
- electric automation (automated devices and systems which control the operations of power plants, electrical systems and consumers);
- consumer electrical installations (electrical installations starting from the distribution system supply point, including small-scale and micro power plants).

Competence in at least one of the listed fields must be certified during every instance of specialisation (elective duties):
1) research and education
2) development and management
3) energy policy
4) electrical and technological commerce
5) design
6) installation, operation and oversight

Occupational qualification standards compiled for occupation of electrical engineer:
Electrical Engineer, Level 6

Diploma Electrical Engineer, Level 7 Chartered Electrical Engineer, Level 8 Elektriinseneride kutsete tasemete ülevaade – Lisa 1.
A.2 Tasks
A.2.1 Electrical engineering 1. Fulfilling technical engineering tasks 2. Using information and communications technology (ICT) 3. Fulfilling occupational norms A.2.2 Management and supervision 1. Management 2. Supervision
Specialised areas of work
A.2.3 Electrical networks and systems 1. Developing electrical networks and systems 2. Resolving specialist problems A.2.4 Electric automation 1. Developing automated equipment and systems that conduct the work of electrical networks and systems 2. Resolving specialist problems A.2.5 Consumer electrical installations 1. Developing consumer electrical installations 2. Resolving specialist problems
Elective areas of work
A.2.6 Research and education A.2.7 Development and management. A.2.8 Energy policy. A.2.9 Electrical and technological commerce. A.2.10 Designing. A.2.11 Installation, operation and oversight
A.3 Work environment and specific nature of work
Electrical engineers usually work in offices or on site. Working hours can be flexible. Electrical engineers must be guided by general occupational, electricity and environmental safety requirements.
A.4 Tools
The tools necessary for carrying out tasks are IT hardware and software, electrical tools, measuring tools and protective gear.
A.5 Personal qualities required for work: abilities and characteristics
The profession requires an innovative and environmentally friendly way of thinking that facilitates sustainable development, plus creativity, decision-making and analytical skills, precision, a sense of responsibility, willingness to communicate and cooperate, spatial imagination and adaptability.
A.6 Professional preparation
Chartered Electrical Engineer, Level 8 must have either completed doctoral studies or acquired the occupation of Diploma Electrical Engineer, Level 7. In both instances, professional work experience and refresher training are required.

A.7 Most common occupational titles
Technical manager, development manager, engineer, planner, project manager, operations manager, specialist, researcher, lead researcher, academic lecturer, etc.
A.8 Regulations governing profession
Electricity Market Act, Building Code and Equipment Safety Act.

Part B
COMPETENCY REQUIREMENTS

B.1 Structure of occupation
To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in electrical networks and systems, competences B.2.1-B.2.3 and one competence from B.2.6-B.2.11 must be certified; To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in electric automation, competences B.2.1, B.2.2 and B.2.4 and one competence from B.2.6-B.2.11 must be certified; To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in consumer electronic installations, competences B.2.1, B.2.2 and B.2.5 and at least one competence from B.2.6-B.2.11 must be certified.

B.2 Competences

MANDATORY COMPETENCES

B.2.1 Electrical engineering	EstQF Level 8
Performance indicators: 1. defines and solves complex and unique engineering tasks using innovation, creativity and knowledge of the following: a) mathematics, science, programming, economics, foreign language and philosophy; b) strength of materials, graphics, theoretical mechanics and machinery; c) basics of electrotechnics, principles of power-generating systems (including those connected through an inverter), electricity transmission devices and switchgears, electric automation, functioning of electricity-powered devices, renewable energy and energy efficiency 2. uses and develops solution methods across technological and economic sectors connected with the electrical industry (electronics, market statistics, economy and environmental protection); 3. creates new technologies taking into consideration user needs, the market situation and restrictions; 4. fulfils the requirements of pertinent legal acts and develops quality systems; 5. provides expert evaluations of complex projects, work, processes and other specialised topics; 6. takes part in international professional working groups; 7. uses a computer for information processing, communication, safety and problem-solving at the Independent user level and for problem-solving at the Advanced user level (see Annex 2 – Scale of self-assessment in digital competence); 8. uses appropriate hardware and modern software solutions to resolve specialist problems (e.g. modelling, simulation, analytical and synthesis technology and smart network solutions); 9. keeps up to date with developments in digital technology and supports others in improving their ICT skills; 10. sets ICT-related tasks and places orders with professionals to find solutions, assessing the suitability of the solutions offered. 11. complies with basic data protection requirements; 12. is guided in their work by the professional ethics of engineers (see Annex 3 – Engineer's professional ethics); 13. supports the wider promotion and appreciation of the work and occupation of engineering in society; explains the nature and importance of the occupation and ways in which to pursue it; 14. maintains their qualifications and keeps up to date on technological developments; 15. navigates the various aspects of the occupation and makes proposals for innovative changes; 16. uses at least one foreign language (including Estonian as a foreign language) at the B2 level (see Annex 4 – Language skills level descriptions);	

17. mediates and provides technical information for everybody in a comprehensive manner and participates actively in discussions and meetings; 18. builds relationships and works with colleagues and clients, acting in accordance with best practice in communication; 19. meets the requirements of standards and regulations associated with the occupation (quality management systems, environmental protection and electrical, fire and occupational safety).

B.2.2 Management and supervision	**EstQF Level 8**
Performance indicators: 1. manages teams and coordinates project activities using appropriate management techniques, systems and principles of organisational behaviour; 2. plans and manages economic activities: keeps the project in compliance with the planned budget, activities and legal acts; 3. manages cooperation between connected fields; 4. gathers information on an ongoing basis, analyses activities, gives feedback and adjusts activities as necessary; 5. identifies the abilities and development needs of employees and plans their development; 6. coordinates the work of those being supervised based on the task and developments in the field; 7. passes on professional skills and knowledge, taking into account the needs and expectations of those being supervised.	

COMPETENTCES RELATED TO SPECIALISATION

To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in electrical networks and systems, competence B.2.3 must be certified;

To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in electric automation, competence B.2.4 must be certified;

To obtain the qualification of Chartered Electrical Engineer, Level 8 specialising in consumer electronic installations, competence B.2.5 must be certified.

Electrical networks and systems	
B.2.3 Electrical networks and systems	**EstQF Level 8**
Performance indicators: 1. leads the development of electrical networks and systems, taking into account related fields (e.g. automation and consumer installations). 2. finds innovative solutions to professional problems utilising their experience and advanced professional knowledge; a) development trends in power-generating systems (including those connected through an inverter); b) development trends in electrical networks (transmission and distribution networks); c) development trends in electrical system components (power plant, windmill, producers connected through inverters, overhead power line, cable line, direct current link, substation, transformer, apparatus for switching, capacitor, reactor, apparatus for storing electrical energy, relay control, power consumption units, etc.); d) development trends in renewable energy and energy efficiency; e) development trends in electrical systems (maintaining voltage and frequency); f) development trends on the electricity market; g) development trends in system automatics – potential deviations in a system's performance and possible prevention methods.	

Electric automation	
B.2.4 Electric automation	**EstQF Level 8**
Performance indicators: 1. leads the development of automation devices and systems that conduct electrical networks and systems, taking into account related fields (manufacturing and production automation, etc.);	

2. finds innovative solutions to professional problems utilising their experience and advanced professional knowledge; a) development trends in devices and systems used in micro and small-scale electrical production, business, manufacturing and community buildings and houses (e.g. local area and smart networks); b) development trends in electronic equipment and installations used in innovative technology in consumer electrical installations; c) development trends in automatic control and technological processes (electrical lighting, industrial and building automatics, etc.) in consumer electrical installations; d) development trends in electrical machines (including engines, generators and transformers), electrical drives (including electric transport) and the instrumentation used to drive them; e) development trends in the protection equipment of electrical installations.

Consumer electrical installations	
B.2.5 Consumer electrical installations	**EstQF Level 8**
Performance indicators: 1. leads the development and construction of electrical devices and systems that conduct consumer electrical installations and their being kept operational, taking into account related fields (heating and ventilation installations, robotics, automatics and communication installations, etc.). 2. finds innovative solutions to professional problems utilising their experience and advanced professional knowledge; a) development trends in devices and systems used in micro and small-scale electrical production, business, manufacturing and community buildings and houses (e.g. local area and smart networks); b) development trends in electronic equipment and installations used in innovative technology in consumer electrical installations; c) development trends in automatic control and technological processes (electrical lighting, industrial and building automatics, etc.) in consumer electrical installations; d) development trends in electrical machines (including engines, generators and transformers), electrical drives (including electric transport) and the instrumentation used to drive them; e) development trends in the protection equipment of electrical installations.	

OPTIONAL COMPETENCES

To obtain the qualification Chartered Electrical Engineer, Level 8 one competence from B.2.6-B.2.11 must be certified;

B.2.6 Research and education	**EstQF Level 8**
Performance indicators: 1. leads scientific research and development work and publishes their results according to the subject and methodology; 2. teaches according to the syllabus using appropriate teaching methods; 3. compiles curricula and study materials using appropriate methods; 4. supervises and opposes doctoral theses; 5. compiles reviews of scientific articles, study materials and theses in accordance with the established requirements.	
B.2.7 Development and management	**EstQF Level 8**
Performance indicators: 1. compiles development plans in accordance with development trends in electrotechnics; 2. identifies the field's critical success factors and conducts analyses of competition; 3. compiles alternative strategies, choosing the appropriate measures to realise them and evaluating their efficiency; 4. manages energy systems in accordance with the nature and practical functioning of strategic management; 5. formulates problems arising in the management of energy systems and offers solutions that ensure the economy, reliability and sustainability of the functioning of energy systems.	
B.2.8 Energy policy	**EstQF Level 8**
Performance indicators:	

1. analyses, describes and leads the process of shaping energy policy in an international context; 2. predicts the effects of energy policy on the economy, assesses potential risks and suggests ways of minimising them; 3. assesses the effect of energy economics and related fields on society and energy security (including cyber-security) and presents proposals for the making of decisions; 4. analyses, assesses and creates balanced energy policies with mandatory security of supply, optimal influence on the environment and socio-economics and balanced energy prices; 5. explains potential development trends in energetics to the public and decision-makers.

B.2.9 Energy and technology commerce	**EstQF Level 8**
Performance indicators: 1. assesses the effect of the fuel trade, emissions trade and renewable energy on the electricity market; 2. analyses regional fuel and energy markets from the point of view of both security of supply and competitiveness, and predicts market developments; 3. assesses and analyses the effect of market distortion on prices; 4. compiles a balance sheet for energy and capacity and analyses trends in manufacturing and consumption; 5. carries out economic transactions, mediating electrical appliances profitably from manufacturer to consumer, implementing appropriate business methods in different economic situations. 6. develops new marketing solutions, technological services and leadership methods.	

B.2.10 Designing	**EstQF Level 8**
Performance indicators: 1. analyses the input required for designing; 2. analyses existing projects and their costs; 3. approves project solutions (including calculations and schematics), thus assuming responsibility for the proper functioning and safety of electrical installations; 4. offers new technologies and technical solutions for fulfilling the same functions; 5. organises cooperation with subscribers and communication specialists; 6. leads and develops planning processes, including appropriate software; 7. compiles expert reports in compliance with the requirements of legal acts.	

B.2.11 Installation, operation and oversight	**EstQF Level 8**
Performance indicators: 1. leads installation, operation and oversight duties on site, following legal acts and normative documents (including standards and user manuals) and is responsible for compliance with machinery safety requirements; 2. leads and checks compliance with schedules in accordance with normative documents; 3. compiles documentation requirements and monitors their fulfilment; 4. organises and performs audits and expert reports on electrical installations in compliance with the requirements of legal acts.	

Part C
GENERAL INFORMATION AND ANNEXES

C.1 Information concerning compilation and certification of occupational qualification standard and reference to classification of occupations	
1. ID of occupational qualification standard in register of occupational qualifications	07-03052018-1.1.3/6k
2. Occupational qualification standard compiled by:	Lembit Vali, Eesti Elektroenergeetika Selts Lauri Öövel, OÜ Energoservis Hannes Mäe, Siemens Osakeyhtiö Eesti filiaal Tiit Metusala, Tallinna Tehnikaülikool Tõnis Viira, Elering AS Renè Nukki, Tallinna Tehnikakõrgkool
3. Occupational qualification standard approved by:	Energy, Mining and Chemical Industry
4. No. of decision of Sectoral Council	10

5. Date of decision of Sectoral Council	03.05.2018
6. Occupational qualification standard valid until	29.03.2023
7. Occupational qualification standard version no.	6
8. Reference to International Standard Classification of Occupations (ISCO 08)	2151 Electrical Engineers
9. Reference to European Qualifications Framework (EQF)	8
C.2 Occupational title in foreign language	
English:	Chartered Electrical Engineer, EstQF Level 8
English:	Chartered Engineer of Consumer Electrycal Equipment
English:	Chartered Engineer of Electrical Automation
English:	Chartered Engineer of Electrical Systems and Networks
C.3 Annexes	
Lisa 1 Elektriinseneride kutsete tasemed	
Lisa 2 Scale of self-assessment in digital competence	
Lisa 3 Engineer's Professional Ethics and Code Of Conduct	
Lisa 4 Language skills level descriptions	