Level 4 End-Point Assessment for Electrical Power Networks Engineer – Asset Management Engineer

EPA Specification Section 4 – The EPNE Standard and Pathway with Amplification and Guidance

Contacts

This specification has been designed to provide all the advice and guidance you need to prepare yourself and your apprentices for end-point assessment. However, if you have any further questions please contact the EUIAS Help Desk using one of the following:

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The Electrical Power Networks Engineer Standard in detail

The Electrical Power Networks Engineer consists of the following core requirements, this applies across all pathways:

- Core Technical Knowledge (10 elements)
- Core Skills (11 elements)
- Core Behaviours (6 elements)

The following pages list each of the elements of the Standard and additional amplification and guidance from the EUIAS on the range and depth expected.

Core Technical Knowledge

Assessed in Knowledge Test

CTK1 Electrical power principles electrical power principles: alternating current and direct current theories; dynamic and static engineering systems; application of electrical and electronic circuit theory; the use of complex wave forms

CTK2 Three-phase systems with consideration being given to harmonics and their effects and the methods of power distribution

CTK3 Electricity network design, capabilities, complexities, operations and topologies; operation and limitations of plant and equipment

CTK4 The operation of the electricity network in normal and fault conditions

CTK5 Safe systems of work and risk management; the application of Electricity Supply Standards, Regulations including environmental requirements. These are Health and Safety at Work Act 1974, Electricity at Work Regulations 1989, Management of Health & Safety at Work Regulations 2003, Control of Substances Hazardous to Health (COSHH) Regulations 2002, The Electricity Safety, Quality and Continuity Regulations 2002, The Environmental Protection Act 1990

CTK10 The key interfaces of the electricity network

Core Technical Knowledge

Assessed in Practical Observation

CTK6 Company requirements with regard to project management tools, techniques and processes

CTK9 Company business planning and resource control measures

Core Technical Knowledge

Assessed in Technical Interview

CTK7 Company engineering policies appropriate to their role

CTK8 Engineering problems including how to identify the problem, gather and analyse all relevant information, provide and implement a workable solution and monitoring its effectiveness

CTK9 Company business planning and resource control measures

Core Technical Knowledge

Amplification and Guidance

CTK1 Electrical Power Principles

This element is assessed during the Knowledge Test and requires a good understanding of electrical power principles, including:

- Alternating and direct current theory and principles including the formulae used for common power calculations
- Application of electrical and electronic circuit theory including the effects and control of power factor
- The principles of complex wave forms and their phase angles
- The principles and purpose of ring and radial circuits
- Series and parallel circuits and the connection of instruments to measure amps, watts and volts in those circuits

CTK2 Three-phase Systems

This element is assessed during the Knowledge Test and requires a good understanding of:

- The design and purpose of three phase systems
- The principles of three phase operation and typical vector groupings
- The fundamental cause, effect and control of harmonics on the network
- The connection and winding arrangement of three phase transformers
- The effect and control of lagging and leading voltage

CTK3 Electricity Network Design

This element is assessed during the Knowledge Test and requires a good understanding of:

- The design principles and layout of overhead and underground networks
- The typical plant and equipment used on the network and their purpose, operation and limitations
- Current UK generation, transmission and distribution system voltages and their regulatory tolerances
- The purpose and principles of earthing substations and the methods used
- The common methods used for voltage control
- The principles and methods used for circuit protection

CTK4 Operation of the electricity network in normal and fault conditions

This element is assessed during the Knowledge Test and requires a good understanding of:

- The plant and equipment used for the isolation and switching of circuits
- The types of network fault, the typical causes and the methods used to identify and control them
- The principles of network protection and the equipment used to protect circuits

- The equipment used to measure and control circuit voltage and current
- The typical types and capabilities of equipment used to conduct switching
- The principles of switching and controlling networks in normal and fault conditions

CTK5 Safe systems of work and risk management. The application of relevant legislation, regulations and standards, including:

This element is assessed during the Knowledge Test and requires a good understanding of:

- The purpose and general requirements of the following: Health and Safety at Work Act 1974, Electricity at Work Regulations 1989, Construction Design and Management (CDM) Regulations 2015, Management of Health & Safety at Work Regulations 2003, The Electricity Safety, Quality and Continuity Regulations 2002
- The principles and techniques used for risk identification and hazard management
- The types, purpose and information contained in typical operational safety documents used to achieve safety from the system
- The fundamental requirements relating to the control and management of work / persons on or near electrical networks
- The responsibilities of persons involved in organising and controlling operational activities of the network

CTK6 Company requirements with regard to project management tools, techniques and processes

This element is assessed during the Practical Observation and requires the apprentice to demonstrate a good understanding of:

- The relevant Company project / engineering management tools which are applicable to the design work / project being observed e.g., how they can be used to control / monitor work projects / inform others of their work project details
- How they have applied the relevant Company project / engineering management tools to the design work / project being observed
- How to use project management tools to present design information in a clear and concise manner e.g., presentation / briefing to a manager using project management tools

CTK7 Company engineering policies appropriate to their role

This element is assessed during the Technical Interview and requires the apprentice to use supporting evidence from their work log to demonstrate a good understanding of:

- The use of Company business planning and resource control measures and how they impact design work e.g., how to identify budget/resource considerations in their project plans
- Presents business planning / resource control measures information in a clear and concise manner to sufficient depth for the audience. e.g., presentation / briefing to a manager demonstrating the use of planning / resource control measures
- Identifies the risks of inadequate business planning / resource control measures in their design project and chooses an appropriate course of action. e.g., demonstrates the methods used to plan their work project to make the most effective use of the resources required including contingency plans

CTK8 Engineering problems including how to identify the problem, gather and analyse all relevant information, provide and implement a workable solution and monitoring its effectiveness

This element is assessed during the Technical Interview and requires the candidate to use supporting evidence from their work log to demonstrate a good understanding of:

- How to gather and analyse relevant information to implement solutions to resolve engineering problems e.g., information they have used to solve engineering problems
- How to recognise and define problems associated with their work projects. e.g., methods they have used for identifying and analysing technical problems
- How to tackle issues in a step by step logical way and make suggestions for solving problems which benefit customers and the business. e.g., plans they have developed to deal effectively with engineering problems

CTK9 Company business planning and resource control measures

This element is assessed during the Practical Observation and the Technical Interview where it requires the apprentice to use supporting evidence from their work log. The assessments require the apprentice to demonstrate a good understanding of:

- How to gather and analyse information in order to implement effective planning solutions or resource requirements in their work projects / designs e.g., examples of information they have used to support their planning or projects
- The link between their design work and the Company strategies and policies which ensure compliance with the Company business planning and resource control measures e.g., examples of how their designs align with the Company policy / procedures

- How to develop project plans / designs that contain objectives, budgets, desired outcomes, timescales and evaluation records e.g., examples of project plans they have developed which contain all necessary data including contingency plans

CTK10 The key interfaces of the electricity network

This element is assessed during the Knowledge Test and requires a good understanding of:

- The purpose, responsibilities and operating principles of the UK power regulator
- The principles used by the regulator to control pricing
- The aims and objectives of the regulator for power companies
- The general purpose of the Electricity Safety, Quality and Continuity Regulations 2002
- The responsibilities placed upon employers for the safety, quality and continuity of the UK electricity supply

Core Skills

Assessed in the Practical Observation

CS1 Comply with company and industry health, safety and environmental standards, regulations, company operating procedures and working practices relating to the health, safety and environmental practices used within the sector

CS2 Ensure that all safety considerations are incorporated and evident in all working practices relating to the preparation and monitoring of safety practices during the observation

CS4 Produce timely communications providing information to stakeholders both in writing and verbally relating the use and dissemination of information relevant to their job role

CS8 Use company IT systems to provide accurate and reliable data to support business decisions relating to the use of IT systems and equipment during the course of their job role

CS11 Uses company risk tools and techniques to evaluate and predict the reliability of engineering systems and equipment relating to the identification and control of risks

Core Skills

Assessed in the Technical Interview

CS3 Apply asset management, design, planning, control, electrical project, or operational engineering principles as appropriate to their role to maintain and improve the integrity, safety and longevity of the transmission/distribution electrical network relating to the use and implementation of asset management methods and processes during their work projects

CS5 Read, understand and interpret technical information relative to their role, identified in company strategies and policies and work in compliance with technical specifications relating to the interpretation and delivery of technical information during their work projects

CS6 Produce clear and precise reports in relation to their activities to line management, other business departments and/or to external stakeholders relating to the production and use of technical reports and communication of information to relevant parties

CS7 Develop and agree project plans to undertake their activities. These plans will contain clear objectives, budgets, desired outcomes and timescales. Also included will be implementation criteria, monitoring process controls and evaluation records relating to the development and use of project plans relevant to their job role

CS9 Demonstrate that their work activities supports the business to achieve its regulatory incentive mechanisms relating to their awareness of regulatory requirements and how they affect the projects undertaken

CS10 Provide information to support business planning processes in relation to their role activities relating to the production of relevant technical information and implementation into the business planning process

Core Skills

Amplification and Guidance

CS1 Comply with company and industry health, safety and environmental standards, regulations, company operating procedures and working practices

- How their design work complies with HS&E requirements and the health, safety and environmental considerations which affect their projects e.g., the relevant health, safety and environmental legislation relevant to the planning and development of their asset management projects
- How they follow and comply with the appropriate Company HS&E policies and procedures. e.g., examples of how relevant legislation has

influenced their projects

- How to present HS&E information in a clear and concise manner to sufficient depth for the audience. e.g., brief a supervisor / manager on the HS&E considerations / requirements for an asset management project

CS2 Ensure that all safety considerations are incorporated and evident in all working practices

- How to recognise and identify specific risks associated with their design work and choose appropriate courses of action e.g., examples of how specific risks have been identified in their project work and how they dealt with it
- How they follow and comply with the appropriate safety considerations. e.g., examples of how they have had to change a project to cater for a safety consideration
- Presents safety information in a clear and concise manner to sufficient depth for the audience. e.g., brief a supervisor / manager on a safety consideration in their project plans and their proposal to deal with the requirements

CS3 Apply asset management, design, planning, control, electrical project, or operational engineering principles as appropriate to their role to maintain and improve the integrity, safety and longevity of the transmission/distribution electrical network

- How they have gathered and analysed relevant information in order to maintain and improve the integrity / safety / longevity of the electrical network e.g., examples of technical information they have gathered and used to support the development of their asset management projects
- How they have linked their design work to Company strategies and policies to ensure compliance with the Company engineering principles e.g., examples of project alterations they have made to align with the Company strategy / policy
- How their engineering designs support the business / client to achieve regulatory incentive mechanisms. e.g., examples of how their project designs have improved the reliability of the network and reduced potential outages

CS4 Produce timely communications providing information to stakeholders both in writing and verbally

- Present information in a clear and concise manner to sufficient depth for the audience. e.g., a briefing / presentation to a supervisor / manager of their progress with an asset management project
- Demonstrates that others' views are considered and support, where required, is offered to them. e.g., examples of how they have taken on board other views (internal / regulatory) and modified a project to cater for the changes
- Speaks confidently, listens to others and takes required action to progress work. e.g., a briefing / meeting with a stakeholder/manager to

understand the requirements of a new project

CS5 Read, understand and interpret technical information relative to their role, identified in company strategies and policies and work in compliance with technical specifications

- How they have gathered and analysed relevant information in order to produce work projects / designs which meet Company requirements / specifications e.g., examples of technical specifications / data they have used to support the development of their projects which align to the Company strategies / policies
- How they have used and interpreted technical Information to develop project plans that contain objectives / budgets / desired outcomes / timescales / evaluation records e.g., examples of project plans they have developed which contain all of the relevant detail and align with the business strategies / policies
- How they have used technical information to recognise and define design problems which they have tackled in a logical manner e.g., how they have used system plans to identify a project design problem and how they have resolved the issue

CS6 Produce clear and precise reports in relation to their activities to line management, other business departments and/or to external stakeholders

- How they have gathered and analysed relevant information in order to produce clear and precise reports in relation to their activities to line management, other business departments and/or to external stakeholders e.g., examples of technical reports developed which have / are being used to inform / influence stakeholders in relation to an asset management project
- How the reports they have produced link to Company strategies and polices e.g., examples of how their report/s meet the design specifications of the business
- How reports they have produced have been used to support internal and / or external stakeholder requirements e.g., examples of reports they have developed which have been used to influence / gain approval for their asset management projects

CS7 Develop and agree project plans to undertake their activities. These plans will contain clear objectives, budgets, desired outcomes and timescales. Also included will be implementation criteria, monitoring process controls and evaluation records

- How they have gathered and analysed relevant information in order to develop and agree project plans e.g., examples of project plans they have developed which have been used to agree activities or are being presented to gain agreement from a manager / supervisor

- How they have developed project plans that contain objectives, budgets, desired outcomes, timescales and evaluation records e.g., examples of project plans they have developed or are presenting which contain all of the necessary items'
- How project plans they have produced have been used to deliver required stakeholder outcomes e.g., examples of project plans they have produced which have been used or are being presented to gain stakeholder approval

CS8 Use company IT systems to provide accurate and reliable data to support business decisions

- Identify and describe the use of the appropriate Company IT systems, techniques and processes used in their design work e.g., use a range of software packages including specific Company design software to work on an asset management project
- Use the appropriate Company IT techniques and processes in their design work e.g., demonstrate the use of design software when working on their project/s
- Use IT systems to present design information in a clear and concise manner to sufficient depth for the audience. e.g., brief a manager / supervisor on their design / project progress using the Company's design software

CS9 Demonstrate that their work activities supports the business to achieve its regulatory incentive mechanisms

- How they have gathered and analysed relevant information in order to support the business to achieve its regulatory incentive mechanisms e.g., examples of how their designs have improved network reliability which has contributed to a reduced level of faults
- How their work projects / designs link to Company strategies and polices and support the achievement of regulatory incentive mechanisms e.g., examples of how their designs improve the integrity and longevity of the network
- How the Company regulatory incentive mechanisms impact / affect relevant stakeholders and their requirements e.g., examples of where they have adapted or amended an asset management project to comply with the Company's strategy

CS10 Provide information to support business planning processes in relation to their role activities

- How they have gathered and analysed relevant information in order to support the business planning processes in relation to their role activities e.g., examples of how they have used information to organise and plan their asset management projects
- How they have developed project plans that support / comply with the business planning processes e.g., example of project plans they have developed or are working on and how they align with the business planning timelines
- Identify stakeholders which are affected by the business planning processes and how they are affected e.g., contacting an internal / external stakeholder/s to keep them informed of the progress of an asset management project and where it is in the planning process

CS11 Uses company risk tools and techniques to evaluate and predict the reliability of engineering systems and equipment

- Identify and describe the use of company risk tools and techniques to evaluate and predict the reliability of engineering systems and equipment used in the designs e.g., examples of how they have used engineering systems / data to evaluate the performance / specification of apparatus for their asset management projects
- Use Company risk tools and techniques to evaluate the engineering systems and equipment used in their designs e.g., example of using Company systems to evaluate / model the use of specific arrangements / equipment on the network for an asset management project
- Presents all information in a clear and concise manner to sufficient depth for the audience. e.g., presents / briefs a supervisor / manager on their proposal for the use of equipment in their asset management project

Core Behaviours

Assessed in the Practical Observation

The behaviours are assessed through natural performance during the practical observation and have been incorporated into the relevant core skills elements

CB1 Health, Safety & Environment - follows health, safety and environmental policies and procedures and is prepared to challenge unsafe behaviour using appropriate techniques to ensure the protection of people and property when working alone and/or with teams. Demonstrates high concentration and the desire to reduce risks through regular monitoring and checking information

CB3 Interpersonal Skills - works well with people from different disciplines, backgrounds and expertise. Takes others' needs and concerns into account and supports them to accomplish an activity safely and on time

CB5 Risk Awareness - has the embedded desire to reduce risks through systematic monitoring and checking of information identifying mitigation actions on an on-going basis

Core Behaviours

Assessed in the Technical Interview

CB2 Stakeholder management – is proactive in identifying their stakeholders and managing their expectations, presenting appropriate information to them clearly and concisely

CB4 Analysing and solving problems – takes responsibility for solving problems by identifying and analysing the issues and drawing logical, sound solutions that benefit customers and the business

CB6 Planning & organising – takes a forward looking perspective when considering the delivery of decisions, activities and projects and ensure plans are in place to manage anticipated issues, considers contingency planning

Core Behaviours

Amplification and Guidance

CB1 Health, Safety & Environment (Practical Observation)

- How they follow health, safety and environmental policies and procedures and where necessary challenge unsafe behaviour using appropriate techniques e.g., demonstrates compliance with Company HS&E policies and procedures
- Demonstrates high levels of concentration and the desire to reduce risks through regular monitoring and checking of information e.g., takes responsibility for self and others and autonomy in making decisions to implement HS&E policies and procedures

CB2 Stakeholder management (Technical Interview)

- Proactive in identifying stakeholders and managing their expectations, presenting appropriate information e.g., takes responsibility for analysing situations and drawing logical, sound solutions that benefit customers and the business
- Provide stakeholders with appropriate information clearly and concisely to support the business planning process e.g., meetings with internal / external stakeholders to discuss projects and manage their expectations

CB3 Interpersonal skills (Practical Observation)

- Demonstrates how they can work well with people from different disciplines, backgrounds and expertise e.g., communicates and works well with other people as a team effort to achieve results
- Demonstrates how they take others' needs and concerns into account and supports them to accomplish an activity safely and on time e.g., listens and takes on board others views during discussions / meetings

CB4 Analysing and solving problems (Technical Interview)

- Takes responsibility for solving problems by identifying and analysing the issues and drawing logical, sound solutions that benefit customers and the business e.g., discussions / briefing with manager / supervisor to discuss solutions to project issues
- Take responsibility for solving problems by identifying and analysing issues and agreeing contingency measures e.g., discussion with supervisor / stakeholder

CB5 Risk awareness (Practical Observation)

- Demonstrates they have an embedded desire to reduce risks through a systematic approach e.g., examples of risk registers risk analysis for projects
- Monitors and checks information on an on-going basis and takes mitigating actions when required e.g., examples of project planning with check points to monitor progress / measures in place

CB6 Planning & organising (Technical Interview)

- Takes a forward-looking perspective when considering the delivery of decisions, activities and projects e.g., discussion with supervisor / stakeholder
  to plan project progression
- Ensures plans are in place to manage anticipated issues, considers contingency planning e.g., discussion with supervisor / manager
  to plan project development and agree contingency measures

Asset Management Engineer Pathway

In addition to the Core Knowledge, Skills and Behaviours the Asset Management Engineer Pathway also contains:

- Specific Skills - 8 elements

The following list each of the elements of the Asset Management Engineer pathway providing amplification and guidance on the range and depth expected this is then followed by the assessment method(s) used per element.

Specific Skills Asset Management Engineer
Assessed in the Practical Observation
SS2 Plan, develop and produce long term network reinforcement plans taking into account emerging technologies and projected future load requirements
SS3 Understand and interpret Regulatory requirements and business plans and contribute to the production of regulatory technical returns
SS4 Assimilate complex external information to inform company decisions
SS5 Undertake Evaluate plant and equipment proposals and recommend company approaches
SS6 Instigate, as appropriate, investigations into asset, systems or process failures as well as undertaking network performance analysis
Specific Skills Asset Management Engineer
Assessed in the Technical Interview
SS1 Support the development of innovative policy solutions to best serve the needs of customers and stakeholders
SS7 Support the identification of new and existing innovation projects

SS8 Identify the implications of the next generation of low carbon energy and how it influences the way the network is operated

Specific Skills Asset Management Engineer

Amplification and guidance

SS1 Support the development of innovative policy solutions to best serve the needs of customers and stakeholders (Technical Interview)

- Confidently explains and demonstrates how they have gathered and analysed relevant information to support the development of engineering solutions e.g., examples of information gathered to support project development
- Demonstrates how the work they have conducted links and supports Company policies / strategies e.g., examples of meetings with engineers / stakeholders to plan and agree projects
- Demonstrates how their work activities have supported the business / stakeholders to achieve regulatory requirements e.g., examples of project work they have completed which improves the network efficiency and supports regulatory requirements

SS2 Plan, develop and produce long term network reinforcement plans taking into account emerging technologies and projected future load Requirements (Practical Observation)

- Demonstrates how they have used Company policies and procedures to produce long term network reinforcement plans e.g., examples of work projects they have produced
- Demonstrates how they can present information in a clear and concise manner with sufficient depth have others e.g., discussion / presentation of project plans to colleagues / stakeholders
- Demonstrates they can speak confidently and listen to others, taking action where required. e.g., discussion / presentation of project plans to colleagues / stakeholders

SS3 Understand and interpret Regulatory requirements and business plans and contribute to the production of regulatory technical returns (Practical Observation)

- Demonstrates how they have used Company policies and procedures to interpret and apply regulatory requirements to achieve technical returns e.g., examples of relevant work projects which meet regulatory requirements
- Presents information clearly and concisely demonstrating how they have interpreted and implemented plans which meet regulatory requirements and / or business plans e.g., meetings / presentation with managers / stakeholders to discuss and agree project plans
- Demonstrates the impact of their work activities / projects on the regulatory outcomes of the business e.g., meetings / presentation with managers / to discuss / agree project plans

SS4 Assimilate complex external information to inform company decisions (Practical Observation)

- Demonstrates how they can present complex external information to inform company decisions clearly and concisely e.g., presentation / meeting with managers / stakeholders
- Demonstrates how the views of others have been considered during the assimilation of complex external information e.g., examples from meetings conducted / emails
- Identifies the impact of budget / resource considerations when considering complex external information to inform Company decisions e.g., discussion / meeting with colleagues / stakeholders

SS5 Evaluate plant and equipment proposals and recommend company approaches (Practical Observation)

- Demonstrates how they have used Company policies and procedures to support their evaluation of plant and equipment proposals e.g., examples of work projects / proposals
- Demonstrates how they are able to recognise potential risks with proposals and takes the appropriate course of action
- Identifies the impact of budget / resource considerations when considering plant and equipment proposals e.g., discussion / meeting with colleagues / managers

SS6 Instigate, as appropriate, investigations into asset, systems or process failures as well as undertaking network performance analysis (Practical Observation)

- Demonstrates how they ensure Health, Safety and Environmental considerations are taken into account and prioritised when instigating or taking part

in the investigation of asset system or process failure e.g., example of investigations being carried out / conducted

- Demonstrates how they have used Company policies and procedures to conduct investigations into asset system or process failure e.g., examples of information presented / delivered
- Presents information clearly and concisely to conduct the investigation of asset system or process failure e.g., examples of Company policies and procedures used / referenced

SS7 Support the identification of new and existing innovation projects (Technical Interview)

- Demonstrates how they have gathered and analysed relevant information to support the development of new and existing innovation projects e.g., examples of project plans they have produced where they have managed conflicts with contractors / stakeholders
- Demonstrates how their projects link to Company strategies and policies to ensure compliance with technical specifications e.g., explains how their asset projects have aligned with the Company strategy and only incorporate approved assets which meet the technical specification
- Clearly identifies the stakeholders involved in the planned work, their requirements and the desired outcomes e.g., provide examples of developed asset plans which required them to be accountable for identifying and informing the relevant stakeholders

SS8 Identify the implications of the next generation of low carbon energy and how it influences the way the network is operated (Technical Interview)

- Demonstrates how they have gathered and analysed relevant information to identify the implications of the next generation of low carbon energy and how it influences the way the network is operated e.g., examples of information / technical data they have studied to conclude their findings
- Demonstrates how their work links to Company strategies and policies to ensure compliance with technical specifications e.g., explains how their asset projects have aligned with the Company lo carbon strategy and utilise assets which meet the Company technical specifications
- Demonstrates how they have recognised and defined problems to the network from low carbon energy and make suggestions for improvement e.g., minutes from asset management meetings / evidence of discussions with colleagues / stakeholders to resolve asset problems