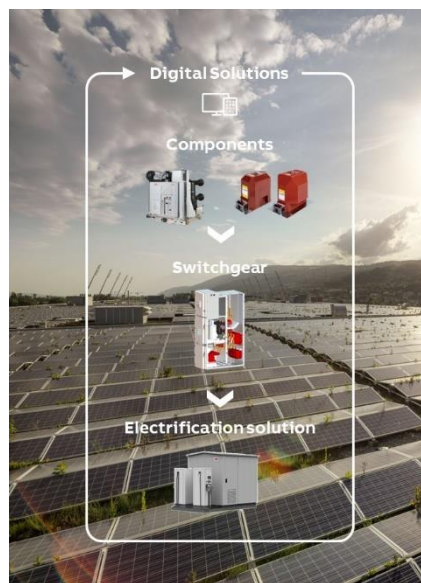


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Prepared: Sai Kanuparthi	Checked: ELDS Engineering Council	Approved: Lorenzo Bonzi	Replaced	Valid for: ELDS	

**ABB internal**

## **Distribution Solutions (ELDS)**



## **Project and Requisition Engineering Learning Catalogue**

<b>ABB</b>	<b>INSTRUCTION</b>		<b>2NAA000082</b>	
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## Revision History

Rev .A 31<sup>st</sup> July 2018

All sections. 1<sup>st</sup> Issue of the document after the review by ELDS Engineering Council and FCA Assessor team.

Rev. B 27<sup>th</sup> March 2020

All sections are updated with ELDS.

All links are verified and updated.

All eLearning courses are once more checked for availability.

Rev. C 16<sup>th</sup> March 2022

All sections are updated.

New Learning Areas are introduced to meet the revised Job Descriptions introduced under Job Family Group Engineering.

All links are verified and updated.

All eLearning courses are once more checked for availability in MyLearning Portal.

Rev. D February 2024

All sections are updated.

New Learning Areas are introduced to meet the revised Job Descriptions introduced under Job Family Group Engineering.

All links are verified and updated.

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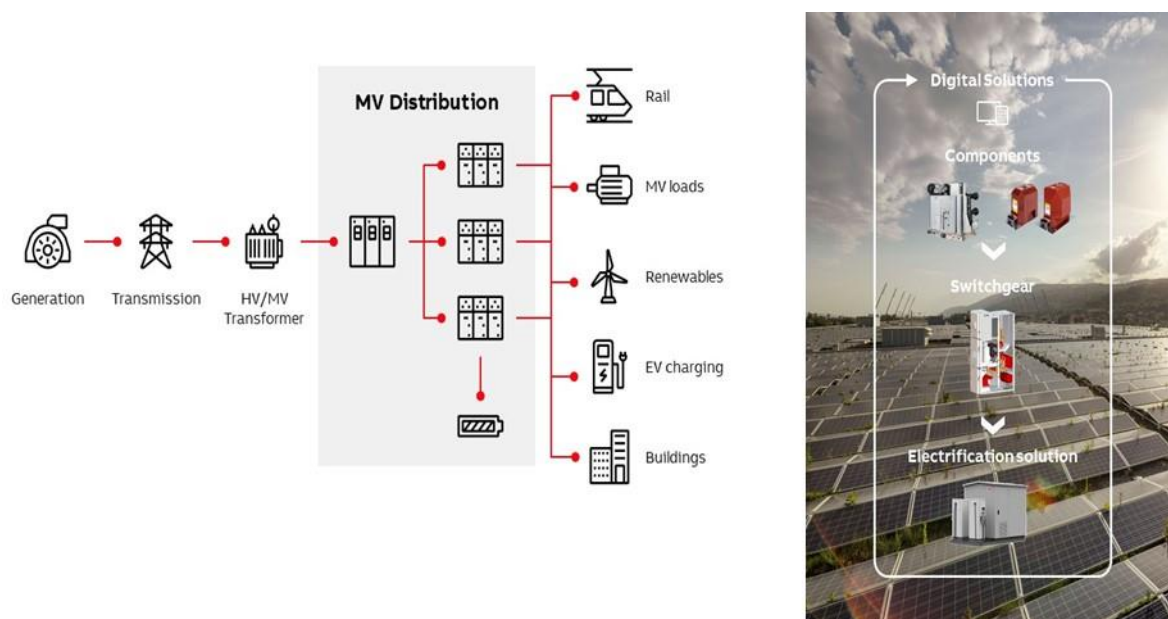
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## 1 Motivation for Engineering Learning Catalogue

The core technologies of Distribution Solutions include Breaking and Protection. The project and requisition engineering teams in Distribution Solutions provides the solutions/application expertise for these technologies to meet our customer's business needs and expectations related to distribution of power/energy.



Safe, Smart and Sustainable Electrical Distribution Solutions

This Learning Catalogue has been developed in alignment with ABB Skills Framework to ensure a uniform understanding of the skills and competency requirements for each engineering job within Job Family Project Engineering. Each engineer in our division is empowered to take ownership of their career, learning & development to meet the needs and expectations of customers' and market. This will "Enhance Customer Experience; and Deliver Value and Delight" as we design and implement "Safe, Smart and Sustainable Energy Distribution Solutions" to our customers.

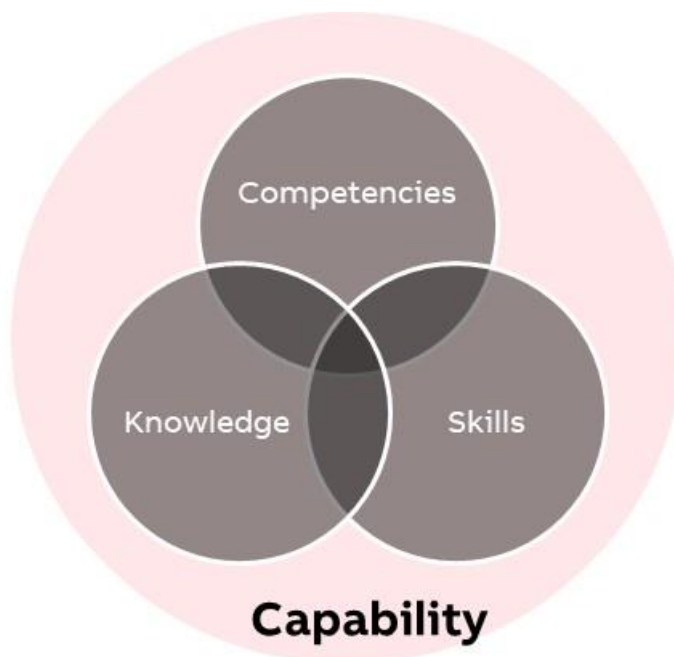
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## 2 People Development

### 2.1 Skills and Competencies

ABB Skills Framework will ensure a uniform understanding of the skills and competency requirements for each engineering job across ABB. One of the key activities as part of Skills and Competencies Assessment is creation of Development Plan by applying ABB's Learning Philosophy.

Functional Competency	Description
Engineering Technical Expertise	People demonstrating this competency apply their depth of knowledge, judgement & expertise to achieve/implement effective (efficient and high quality) and safe results/solutions. They keep their expertise up to date.
Engineering Solutions	People demonstrating this competency understand customer infrastructure and needs. They identify, improve, and deliver engineering solutions that meet business needs and add value to customer.
Engineering Processes and Tools	People demonstrating this competency apply and improve engineering and administrative processes, tools in a systematic and structured way, align these to external standards and manage documentation so that optimal results are achieved with defined contents, deadlines, and budget.
Engineering Risks and Opportunities	People demonstrating this competency assess risks to identify consequences with accuracy and by using knowledge of risk management, they propose means with proper analyses of cost and other associated impacts to the project/organization and execute means to mitigate risks. They capture opportunities and act on them.
Technical Information Sharing	People demonstrating this competency achieve efficient transfer of know-how by sharing their knowledge with colleagues/ stakeholders. They ensure clear, efficient, and timely exchange of information to ensure good results. They build and maintain constructive networks, and convince stakeholders to take desirable action by using relevant arguments
Planning & Prioritizing	Creates and adjusts plans in line with strategic goals and priorities coordinating with interrelated functions to increase efficiency.
Consulting & Facilitating	Enriches the operation of other organizations using own expertise. Establishes partnering relationships and builds mutual commitment. Facilitates the consultation process to achieve good results.



Competencies Knowledge and Behavior that lead to success in a job	Skills Learned and applied abilities needed to perform a job well	Knowledge Information, Tools, Techniques, and Methods that are learned
    <ul style="list-style-type: none"> <li>Programming</li> <li>Decision Making</li> <li>Strategic Planning</li> <li>Networking</li> </ul>	   <ul style="list-style-type: none"> <li>Programming Language</li> <li>Using a tool / machinery</li> <li>Using EPLAN Electric P8</li> </ul>	   <ul style="list-style-type: none"> <li>Business Opportunities and Challenges</li> <li>Statutory regulations</li> <li>Process Methodology</li> </ul>

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## 2.2 Learning Areas

The following learning areas reflect the competencies, skills and knowledge required for project and requisition engineers in Distribution Solutions. This will provide our engineering community capability development (which will drive quality, efficiency, and consistency in customer experience) as well as a career path (which drives engagement, and as a result performance and customer experience).

	Associate Designers Designers Sr. Designers Associate Project Engineers	Principal Designers Project Engineers Project Lead Engineers	Sr. Project Engineers Principal Project Engineers Sr. Project Lead Engineers
Application of Breaking and Protection technologies	<ul style="list-style-type: none"> <li>Distribution Solutions overview</li> <li>Switchgear components, and functions</li> <li>Switchgear functional engineering and design</li> <li>Packaging Solutions I</li> </ul>	<ul style="list-style-type: none"> <li>Digital Switchgear</li> <li>Digital Solutions Design and Implementation I</li> <li>Direct Current (DC) Systems</li> <li>Packaging Solutions II</li> </ul>	<ul style="list-style-type: none"> <li>Cyber-Security for Operational Technology (OT)</li> <li>Digital Solutions Design and Implementation II</li> <li>Power Systems Studies</li> <li>Segment-specific Energy Distribution Solutions</li> </ul>
Processes and Tools to enhance customer experience	<ul style="list-style-type: none"> <li>Engineering Design Tools and Applications</li> </ul>	<ul style="list-style-type: none"> <li>Safety in Design</li> <li>Design Thinking</li> <li>Data Driven Insights</li> </ul>	<ul style="list-style-type: none"> <li>Design Verification</li> <li>Agile / Lean Methodologies</li> <li>Design for Excellence</li> </ul>
Collaboration with Project Manager and Project Execution team	<ul style="list-style-type: none"> <li>Planning and Prioritizing</li> <li>Engineering Change Management</li> </ul>	<ul style="list-style-type: none"> <li>Engineering Risks and Opportunities</li> </ul>	
Soft skills/ Leadership skills	<ul style="list-style-type: none"> <li>Technical Information Sharing</li> </ul>	<ul style="list-style-type: none"> <li>Influencing without authority</li> </ul>	<ul style="list-style-type: none"> <li>Coaching</li> <li>Facilitating and problem solving</li> <li>Consulting</li> </ul>

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### 2.3 Developing Engineering Skills and Competencies

Enhancing the application engineering capability, and domain knowledge of the customer industry/segment we are serving is one of the key areas identified as part of the skills and competencies development for Engineers.

ABB's Learning Philosophy follows 70:20:10 principle for developing skills and competencies.

Learning category	Typical activities with examples
On-the-job (70%)	<p>Experiential learning (learn from work experience)</p> <p>Business related reflection</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Study Customer's Contract and discuss with Project Manager and team what Standards and Statutory requirements, solutions(s) are applicable to meet the contractual obligations.</li> <li>• Identify the top five (5) risks repeated from the last 3 projects related to project scope.</li> <li>• Complete Design Verification according to IEC/IEEE/ANSI/UL/GB standards.</li> <li>• Participate in a Design Verification according to IEC/IEEE/ANSI/UL/GB standards as part of Project Peer Review</li> <li>• Actively utilize Switchgear Configurator, EPLAN Electric P8 for electrical design, SolidWorks /CREO for mechanical design.</li> <li>• Validate the Bill of Materials (BOM) before uploading to SAP.</li> <li>• Study a report related to "Power Systems Studies", and understand how it impacts the design of Electrical Distribution System e.g., Relay Settings</li> </ul>
Along-the-job (20%)	<p>Self-reflection, Coaching, mentoring</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Develop 3 actions for from lessons learned on past 3 projects.</li> <li>• Identify the areas where you need coaching or mentoring along with your Line Manager.</li> </ul>
Off-the-job (10%)	<p>This Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> <li>• Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)</li> <li>• Self-study (studying the published information on ABB Internet/Intranet, reading books etc.,)</li> </ul>



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## 2.4 MyLearning – Key features and benefits

In the new learning tool, you will find the training catalog (courses, classes and training plans) and your personal historical training data migrated from Training Partner (enrollments up to 5 years).



Modern learning system with intuitive and self-explanatory user interface



Available in 10 languages: English, Spanish, German, French, Italian, Portuguese, Russian, Chinese, Japanese, Korean. More will be added in due course



Access 24x7, remote, both on-line and off-line



Smartphone and Tablet Operating Systems: iOS and Android



Offline access and learning synchronization: e-learning courses on the go, allowing continued learning across different devices from wherever you had paused



Social and Gamification:

- Course Rating – Learners can rate training once they have completed it.
- Share – with a single click, learners can share catalog items with peers and colleagues
- Leaderboard – earn points for registration



Manager functionality:

- Possibility to assign learning to team members
- Progress status overview of trainings
- On demand access to ad hoc reports – automatically generated by the system and delivered via mail

## Logging In, Overview

To get started, please

1. Go to ABB [MyLearning](https://mylearning.abb.com/) or <https://mylearning.abb.com/>
2. Sign in (top right button),
3. Go to catalogue
4. Search for courses you are looking.

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### 3 Application of Breaking and Protection technologies

#### 3.1 Distribution Solutions Overview

Competency	Learning Area	Applicability
Engineering Technical Expertise	Distribution Solutions Overview	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver engineering solutions that meet customers' needs and expectations.

**What are the Learning Area Objectives?**

- Understand ABB Electrification Distributions Solutions business, product, and solution portfolio.

**What are the suggestions/examples to apply this learning on-the-job?**

Study Customer's Contract, and discuss with Project Manager and team:

- What Standards and Statutory requirements are applicable for designing Switchgears to meet the contractual obligations?
- How do we meet the project scope, customers' needs and expectations?
- How will we apply our judgement & expertise to achieve/ implement effective (efficient and high quality) and safe, cyber-secure and sustainable energy distribution solutions?

#### Off-the-job development opportunities for Learning Area - Distribution Solutions Overview

Learning Area Topic	Course Code	Link (if any)
Distribution Solutions portal (inside.abb )		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions</a>
abb.com		<a href="https://new.abb.com/medium-voltage">https://new.abb.com/medium-voltage</a>
Distribution Solutions Training portal		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-and-sales/Distribution-Solutions-Training">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-and-sales/Distribution-Solutions-Training</a>
S1537E – Introduction to Distribution Solutions	9CSC006119-GLB-EN	

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.2 Switchgear components, and functions

Competency	Learning Area	Applicability
Engineering Technical Expertise	Switchgear components, and functions	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver engineering solutions that meet customers' needs and expectations.

#### What are the Learning Area Objectives?

To understand "Electrical/mechanical components selection & application, design and functions" related to MV Switchgear e.g.

- Mechanical Construction (e.g., Enclosure, modular compartments...)
- Circuit Breakers
- Current Transformer (CT); Voltage Transformer (VT) and CT/VT Sensors
- Relay selection including Trip relays & Auxiliary relays
- Low Voltage Compartment (LVC)
- Power and Control cable connections
- Communication protocols and Communication media
- Contactors
- Cutouts; Switches and Disconnectors
- Vacuum Interrupters & Poles; Epoxy Components
- OEM Switchgear Kits and Parts

#### What are the suggestions/examples to apply this learning on-the-job?

Study Customer's Contract, and discuss with Project Manager and team:

- What Standards and Statutory requirements are applicable for designing Switchgears to meet the contractual obligations?
- What are the functional requirements for designing Switchgears to meet the contractual obligations?
- How do we meet the project scope, customers' needs and expectations?

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## Off-the-job development opportunities for Learning Area – Switchgear components, and functions

Learning Area Topic	Course Code	Link (if any)
3D eCatalogue		<a href="https://new.abb.com/medium-voltage/switchgear/3d-ecatalogue">https://new.abb.com/medium-voltage/switchgear/3d-ecatalogue</a>
Medium Voltage Products		<a href="https://new.abb.com/medium-voltage">https://new.abb.com/medium-voltage</a>
Switchgear webinar series		<a href="https://new.abb.com/medium-voltage/service/training">https://new.abb.com/medium-voltage/service/training</a> (Please look at webinars)

## eLearning Courses (MyLearning Portal)

Learning Area Topic	Course Code	Link (if any)
IEC 62271-1	S785 - IEC 62271-1	
MV Components (Breakers, Switch disconnectors, Earthing switches, Vacuum interrupters, Instrument Transformers & Sensors)	S1511e	<a href="https://mylearning.abb.com/coursepage/15007/ExpertusONE_1">https://mylearning.abb.com/coursepage/15007/ExpertusONE_1</a>
MV switchgear (Overview Primary and Secondary-(AIS/GIS))	S1550e	<a href="https://mylearning.abb.com/coursepage/28003_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/28003_enUS/ExpertusONE_1</a>
S1551E – UniGear Family	S1551e	
S1552E – UniSec	S1552e	
UniGear (AIS)	S844e	
GIS - ABB'S ZX Family	9CSC006636	<a href="https://mylearning.abb.com/coursepage/21219/ExpertusONE_1">https://mylearning.abb.com/coursepage/21219/ExpertusONE_1</a>
S1574E - PrimeGear ZX0	S1574e	
MV Secondary Gas Insulated Switchgear SafeRing /SafePlus	S1564E	<a href="https://mylearning.abb.com/coursepage/28397/ExpertusONE_1">https://mylearning.abb.com/coursepage/28397/ExpertusONE_1</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.3 Switchgear Functional Engineering and Design

Competency	Learning Area	Applicability
Engineering Solutions	Switchgear Functional Engineering and Design	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to
  - apply Breaking and Protection technologies on the job.
  - identify and deliver engineering solutions that meet customers' needs and expectations.

#### What are the Learning Area Objectives?

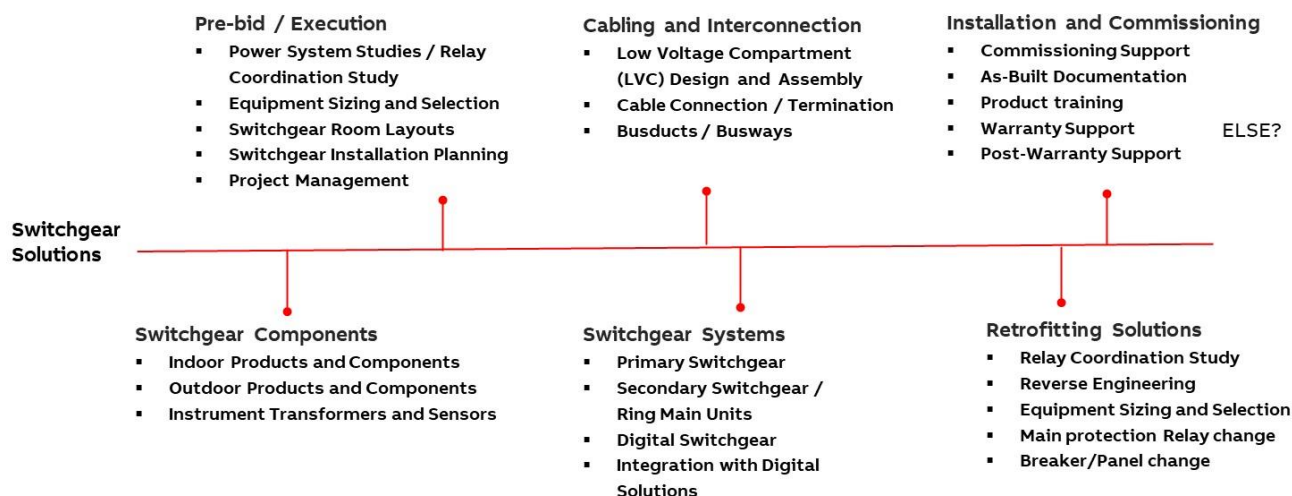
To understand how to translate customer needs while performing Switchgear design:

- Factors influencing the switchgear design
- Technical specifications and limitations while interpreting with Engineering Guidelines published by Technology Centers (if any) and applicable IEC/IEEE/ANSI/UL/GB standards.
- Non-standard site conditions / installation requirements, Type Test, Routine Test & Functional Test requirements to meet contractual obligations
- Part no selections for electrical devices used in switchgear (including Integrated ABB Devices / Modules)
- Verification or selection of CT and VT calculations / specifications
- Power Factor Correction
- Safety Aspects in switchgear design including Arc Flash Protection and Mitigation Solutions
- Standard operating Interlock of product & project specific interlocking as per customer requirement
- Relion® Series relays selection based on Protection & Communication requirements.
- Pressure relief duct
- Insulation coordination (Selection of Surge / Lightning Arrestor) & Cable Termination; Bus ducts

#### What are the suggestions/examples to apply this learning on-the-job?

- Study Customer's Contract, and discuss with Project Manager and team:
  - What Standards and Statutory requirements are applicable to meet the contractual obligations?
  - What are the functional requirements to meet the contractual obligations?
  - How do we meet the project scope, customers' needs and expectations?
- Compile a list of complex protection schemes and discuss with the engineering team.
- Compile a list of complex DTOs and discuss with the engineering team.
- Collaborate with procurement and manufacturing with an aim to reduce overall lead time and improve the quality of deliverables e.g., BOM and manufacturing documentation to support the Single-piece -flow.

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### Factors influencing the switchgear design

<b>Regulations</b> <ul style="list-style-type: none"> <li>IEC/IEEE/ANSI/UL/GB Standards</li> <li>End-user country specific national electricity rules, laws, and regulations</li> <li>Customer / End-user guidelines</li> </ul>	<b>Source(s) of supply</b> <ul style="list-style-type: none"> <li>Utility/public power systems</li> <li>In-plant power generation incl. Renewable energy</li> <li>Emergency power e.g., UPS, Battery storage (ESS)</li> <li>Redundancy</li> </ul>
<b>System parameters</b> <ul style="list-style-type: none"> <li>Rated supply voltage</li> <li>Rated short time withstand current</li> <li>Rated continuous current</li> <li>Rated Peak withstand current</li> <li>Load flow</li> <li>Neutral earthing and grounding</li> <li>Cable/overhead line</li> <li>Over voltage protection</li> <li>Power quality</li> </ul>	<ul style="list-style-type: none"> <li>System measuring and protection</li> <li>Measuring and metering devices</li> <li>Selectivity</li> <li>Control and protection functions</li> <li>Redundancy</li> <li>Tripping times</li> <li>Internal Arc flash Classification (IAC)</li> <li>Fault analysis</li> <li>Earth fault and Neutral connections' systems</li> </ul>
<b>Installation location</b> <ul style="list-style-type: none"> <li>Place of installation</li> <li>Switchgear/MCC building (room) layout</li> <li>Accessibility</li> <li>Transportation and logistics</li> <li>Unmanned substations</li> </ul>	<ul style="list-style-type: none"> <li>Ambient conditions</li> <li>Altitude</li> <li>Air humidity</li> <li>Temperature</li> <li>Hazardous environment</li> <li>Switchgear/MCC building (room) climate</li> <li>Pollutions class</li> </ul>
<b>Segment/sector specific application</b> <ul style="list-style-type: none"> <li>Availability</li> <li>Busbar transfer</li> <li>Switching duties and Switching rates</li> </ul>	<b>Operating/maintenance procedures</b> <ul style="list-style-type: none"> <li>Personal protection equipment (PPE)</li> <li>Operation modes</li> <li>Periodic inspection and maintenance</li> <li>Work instructions</li> <li>Spare parts kit</li> </ul>

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## Off-the-job development opportunities for Learning Area - Switchgear Functional Engineering & Design

Learning Area Topic	Course Code	Link (if any)
Power System Protection practices		<a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
ABB Switchgear Manual		<a href="https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual">https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual</a>
IEC 62271-1	S785 - IEC 62271-1	
S1562e – IEC 62271-200: terms and definitions for MV switchgear	S1562e	<a href="https://mylearning.abb.com/coursepage/27984/ExpertusONE_1">https://mylearning.abb.com/coursepage/27984/ExpertusONE_1</a>
Engineering Guidelines		
DTO (Design to Order)		2NAA000043 DTO control policy
3D eCatalogue		<a href="https://new.abb.com/medium-voltage/switchgear/3d-ecatalogue">https://new.abb.com/medium-voltage/switchgear/3d-ecatalogue</a>
Medium Voltage Products		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/ansi-switchgear">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/ansi-switchgear</a> <a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/MV-GIS-training">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/MV-GIS-training</a> <a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/eco-efficient-gas-insulated-switchgear">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/eco-efficient-gas-insulated-switchgear</a> <a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/primegear-zx0">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/primegear-zx0</a> <a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/medium-voltage-digital-(iec-gb)">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/medium-voltage-digital-(iec-gb)</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.4 Packaging Solutions I

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Packaging Solutions I	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver engineering solutions that meet customers' needs and expectations.

#### What are the Learning Area Objectives?

To understand:

- How preconfigured, standardized, scalable and replicable solutions provide our customers with shorter times, a smoother startup, and less risk.

#### What are the suggestions/examples to apply this learning on-the-job?

Study Customer's Contract, and discuss with Project Manager and team:

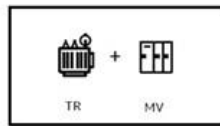
- What Standards and Statutory requirements are applicable for designing "Packaging solutions" to meet the contractual obligations?
- What are the functional requirements for designing "Packaging solutions" to meet the contractual obligations?
- How do we meet the project scope, customers' needs and expectations?
- How do we apply preconfigured, standardized, scalable and replicable solutions to meet the contractual obligations?

#### Off-the-job development opportunities for Learning Area - Packaging Solutions I

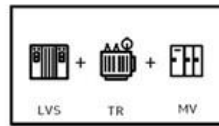
Learning Area Topic	Course Code	Link (if any)
Packaging and Solutions Overview	S1556e	<a href="https://new.abb.com/medium-voltage/packaging-and-solutions">https://new.abb.com/medium-voltage/packaging-and-solutions</a>
UniPack-G	S818e	<a href="https://new.abb.com/medium-voltage/modular-systems/compact-secondary-substations">https://new.abb.com/medium-voltage/modular-systems/compact-secondary-substations</a>
IEC Standards for CSS	S837e; S838e S839e	

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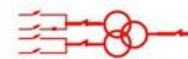
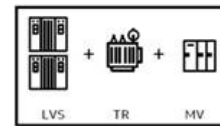




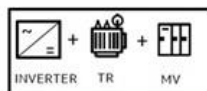
- RMU: 2.4 - 40.5 kV
- Trafo type: Oil/dry



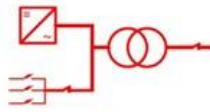
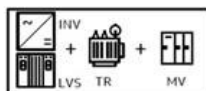
- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V
- Trafo type: Oil/dry



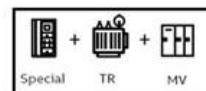
- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V
- Trafo type: Oil/dry



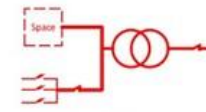
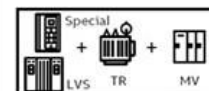
- RMU: 2.4 - 40.5 kV
- Trafo type: Oil/dry
- Inverter



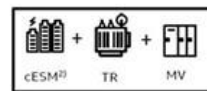
- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V
- Inverter
- Trafo type: oil/dry



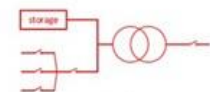
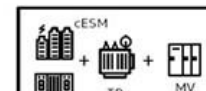
- RMU: 2.4 - 40.5 kV
- Space for free issued item
- Trafo type: Oil/dry



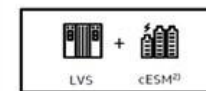
- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V
- Space for free issued item
- Trafo type: oil/dry



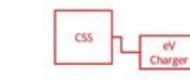
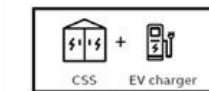
- RMU: 2.4 - 40.5 kV
- Trafo type: Oil/dry
- cESM: Compact energy storage module



- RMU: 2.4 - 40.5 kV
- LVS: 400-800 V
- cESM: Energy storage module
- Trafo type: Oil/dry



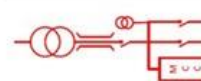
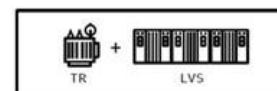
- LVS: 400-800V
- cESM: compact energy storage module



- CSS: compact secondary substation
- EV charger



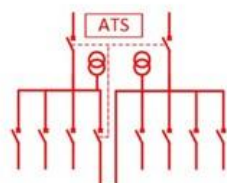
- MV switchgear: up to 40.5 kV, 4000 A, 50 kA
- LV switchgear & MCC: 1 kV, 8000 A, 80 kA
- Dry type transformer
- Bus duct (option)



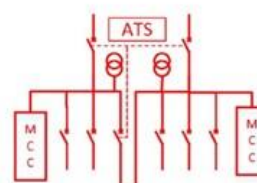
- LV switchgear & MCC: 1 kV, 8000 A, 80 kA
- Dry type transformer
- Bus duct (option)



- MV SWGR: 3.6 kV - 24 kV, ~4000 A, 50 kA
- Full protection and communication
- Auto transfer system pre-tested



- LV SWGR and MCC
- Full protection and communication
- Auto transfer system pre-tested



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### 3.5 Digital Switchgear

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Digital Switchgear	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver Digital Switchgear solutions that meet customers' needs and expectations.

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#### What are the Learning Area Objectives?

To understand Digital Switchgear design:

- Understand Digital Switchgear components including CT and VT sensors functions
- Application and integration of intelligent protection devices (Relion® / ABB IEDs)
- Application of communication networks (MODBUS, PROFIBUS / PROFINET...)
- IEC 61850 and GOOSE Communication
- Communication Redundancy
- Application of transfer switches

---

#### What are the suggestions/examples to apply this learning on-the-job?

- Understand and document the functional requirements for designing Digital Switchgears to meet the contractual obligations, customers' needs and expectations.
- Apply the learning of IED (Intelligent Electronic Devices) / Relion® series relay programming
- Configure and Test Protection & Control applications e.g., MCC, PCC
- Define the IEC 61850 and GOOSE communication protocol to meet the project scope
-

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## Off-the-job development opportunities for Learning Area - Digital Switchgear

Learning Area Topic	Course Code	Link (if any)
Digital Overview		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/abb-ability">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/abb-ability</a>
Digitalize electrical system		<a href="https://new.abb.com/about/our-businesses/electrification/abb-ability/digitalize-your-electrical-system">https://new.abb.com/about/our-businesses/electrification/abb-ability/digitalize-your-electrical-system</a>
UniGear Digital		<a href="https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/unigear-digital">https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/unigear-digital</a>
UniSec Digital		<a href="https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/iec-air-insulated-secondary-switchgear-unisec-digital">https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/iec-air-insulated-secondary-switchgear-unisec-digital</a>
Digital GIS		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/MV-GIS-training">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/switchgear/MV-GIS-training</a>  <a href="https://new.abb.com/medium-voltage/switchgear/gas-insulated-switchgear/iec-gis-primar-distribution/zx-digital">https://new.abb.com/medium-voltage/switchgear/gas-insulated-switchgear/iec-gis-primar-distribution/zx-digital</a>
VD4 Digital Upgrade		<a href="https://new.abb.com/medium-voltage/service/extension-upgrades-and-retrofits/vd4-digitup">https://new.abb.com/medium-voltage/service/extension-upgrades-and-retrofits/vd4-digitup</a>
ABB Digital Substation Products		<a href="https://new.abb.com/medium-voltage/digital-substations">https://new.abb.com/medium-voltage/digital-substations</a>  <a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
Distribution Automation Webinar Series		<a href="https://new.abb.com/medium-voltage/digital-substations/protection-relay-services/training">https://new.abb.com/medium-voltage/digital-substations/protection-relay-services/training</a>
Relion® (ABB IEDs)	P211e (630) P220e (615) P221e (611) P263 (630) P264 (630) REX610 REX640	<a href="https://new.abb.com/medium-voltage/distribution-automation/relion">https://new.abb.com/medium-voltage/distribution-automation/relion</a> <a href="https://new.abb.com/medium-voltage/digital-substations/protection-relays">https://new.abb.com/medium-voltage/digital-substations/protection-relays</a> <a href="https://new.abb.com/medium-voltage/distribution-automation/protection-relay-services/extensions-upgrades-and-retrofits/retrofits">https://new.abb.com/medium-voltage/distribution-automation/protection-relay-services/extensions-upgrades-and-retrofits/retrofits</a>
PCM600	PCM600	<a href="https://new.abb.com/medium-voltage/digital-substations/software-products">https://new.abb.com/medium-voltage/digital-substations/software-products</a>
SSC600	P269	<a href="https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/ssc600">https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/ssc600</a>  <a href="https://new.abb.com/medium-voltage/digital-substations/campaigns/smart-substation-control-and-protection-ssc600">https://new.abb.com/medium-voltage/digital-substations/campaigns/smart-substation-control-and-protection-ssc600</a>
IEC61850		
MODBUS		
PROFIBUS		

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### 3.6 Digital Solutions Design and Implementation I

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Digital Solutions Design and Implementation I	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to Identify and deliver digital solutions that meet customers' needs and expectations.

#### What are the Learning Area Objectives?

To understand:

- Digital Solutions, Internet of Things (IOT) and analytics that provide our customers with shorter lead times, a smoother startup, and less risk.
- Digital solutions design and implementation utilizing Zenon, ZEE600, ZEE600C, AC500 PLC, CP600, RIO600, SMU615, SSC600 and SSC600 SW

#### What are the suggestions/examples to apply this learning on-the-job?

- Document the case-study and share (e.g., Acciona Energia documented in ABB Library as 2NGA001502)  
<https://search.abb.com/library/Download.aspx?DocumentID=2NGA001502&LanguageCode=en&DocumentPartId=&Action=Launch>
- Understand and document the functional requirements for designing "Digital solutions" to meet the contractual obligations, customers' needs and expectations.
- Apply the knowledge to design and implement Digital solutions utilizing Zenon, ZEE600, ZEE600C, AC500 PLC, CP600, RIO600, SMU615, SSC600 and SSC600 SW
- Participate in Integrated Test, Commissioning and Site Acceptance Test (Test) to meet the contractual obligations, customers' needs and expectations.

### Off-the-job development opportunities for Learning Area - Digital Solutions Design & Implementation I

Learning Area Topic	Course Code	Link (if any)
Digital Overview		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/abb-ability">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/abb-ability</a>
SCADA (Zenon)		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/digital-systems-software/abb-ability-zenon">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/digital-systems-software/abb-ability-zenon</a>
zenon Operations Data Management (SharePoint)	9CSC003650-GLB-EN-V1	<a href="https://abb.sharepoint.com/sites/zenonOperationsDataManagement/teamspace/SitePages/Home.aspx?e=1163A7ec728875c6b442d8c58617e0345843a">https://abb.sharepoint.com/sites/zenonOperationsDataManagement/teamspace/SitePages/Home.aspx?e=1163A7ec728875c6b442d8c58617e0345843a</a>
ABB Ability™ Electrification Monitoring and Control ZEE600		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/substation-solutions/zee600">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/substation-solutions/zee600</a>
ZEE600C Substation Automation Unit		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/substation-solutions/zee600/subpage-zee600c-substation-automation-unit">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/substation-solutions/zee600/subpage-zee600c-substation-automation-unit</a>

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Learning Area Topic	Course Code	Link (if any)
ZENON / ZEE600	9CSC003650-GLB-EN-V1 S1621e 9CSC022091-GLB-EN S1599E 9CSC019296e-GLB-EN S1615E 9CSC021870-GLB-EN	<a href="https://mylearning.abb.com/coursepage/19812_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/19812_enUS/ExpertusONE_1</a>  <a href="https://mylearning.abb.com/coursepage/37617_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/37617_enUS/ExpertusONE_1</a>  <a href="https://mylearning.abb.com/coursepage/35558_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/35558_enUS/ExpertusONE_1</a>  <a href="https://mylearning.abb.com/coursepage/37368_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/37368_enUS/ExpertusONE_1</a>
PLC Automation PLCs, Control Panels, Engineering Suite AC500, CP600, ABB Ability™ Automation Builder		Search in ABB Library: 3ADR020077C0204 <a href="https://search.abb.com/library/Download.aspx?DocumentID=3ADR020077C0204&amp;LanguageCode=en&amp;DocumentPartID=&amp;Action=Launch">https://search.abb.com/library/Download.aspx?DocumentID=3ADR020077C0204&amp;LanguageCode=en&amp;DocumentPartID=&amp;Action=Launch</a>  <a href="https://new.abb.com/plc">https://new.abb.com/plc</a>  <a href="https://new.abb.com/plc/control-panels">https://new.abb.com/plc/control-panels</a>
AC500 Training Material		Search in ABB Library: 3ADR010368 <a href="https://search.abb.com/library/Download.aspx?DocumentID=3ADR010368&amp;LanguageCode=en&amp;DocumentPartID=PDF&amp;Action=Launch">https://search.abb.com/library/Download.aspx?DocumentID=3ADR010368&amp;LanguageCode=en&amp;DocumentPartID=PDF&amp;Action=Launch</a>
AC500 Best practices		Search in ABB Library: 3ADR010367 <a href="https://search.abb.com/library/Download.aspx?DocumentID=3ADR010367&amp;LanguageCode=en&amp;DocumentPartID=&amp;Action=Launch">https://search.abb.com/library/Download.aspx?DocumentID=3ADR010367&amp;LanguageCode=en&amp;DocumentPartID=&amp;Action=Launch</a>
PLC Automation Tools Box		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/motion/divisions/drive-products-division/drive-products-and-system-drives-sales-support/plc-automation-toolbox">https://go.insideplus.abb.com/business-areas-and-divisions/motion/divisions/drive-products-division/drive-products-and-system-drives-sales-support/plc-automation-toolbox</a>
Remote I/O and merging units (RIO600 and SMU 615)		<a href="https://new.abb.com/medium-voltage/digital-substations/protection-relays/remote-i-o">https://new.abb.com/medium-voltage/digital-substations/protection-relays/remote-i-o</a>
RIO600	P219e  9CSC013442-GLB-EN-V1	<a href="https://mylearning.abb.com/coursepage/7029_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/7029_enUS/ExpertusONE_1</a>  <a href="https://mylearning.abb.com/coursepage/30237_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/30237_enUS/ExpertusONE_1</a>
Smart substation control and protection SSC600	P269e	<a href="https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/ssc600">https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/ssc600</a>  <a href="https://new.abb.com/medium-voltage/digital-substations/campaigns/smart-substation-control-and-protection-ssc600">https://new.abb.com/medium-voltage/digital-substations/campaigns/smart-substation-control-and-protection-ssc600</a>
Smart substation control and protection SSC600 SW		<a href="https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/smart-substation-control-and-protection-ssc600-sw">https://new.abb.com/medium-voltage/digital-substations/protection-relays/multiapplication/smart-substation-control-and-protection-ssc600-sw</a>
SSC600	P269e 9CSC008166-GLB-EN	<a href="https://mylearning.abb.com/coursepage/23017_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/23017_enUS/ExpertusONE_1</a>
Digital Solutions for Medium Voltage and Low Voltage	9CSC013840-GLB-EN	<a href="https://mylearning.abb.com/coursepage/30564_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/30564_enUS/ExpertusONE_1</a>

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### 3.7 Direct Current (DC) Systems

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Direct Current (DC) Systems	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver DC Systems that meet customers' needs and expectations.

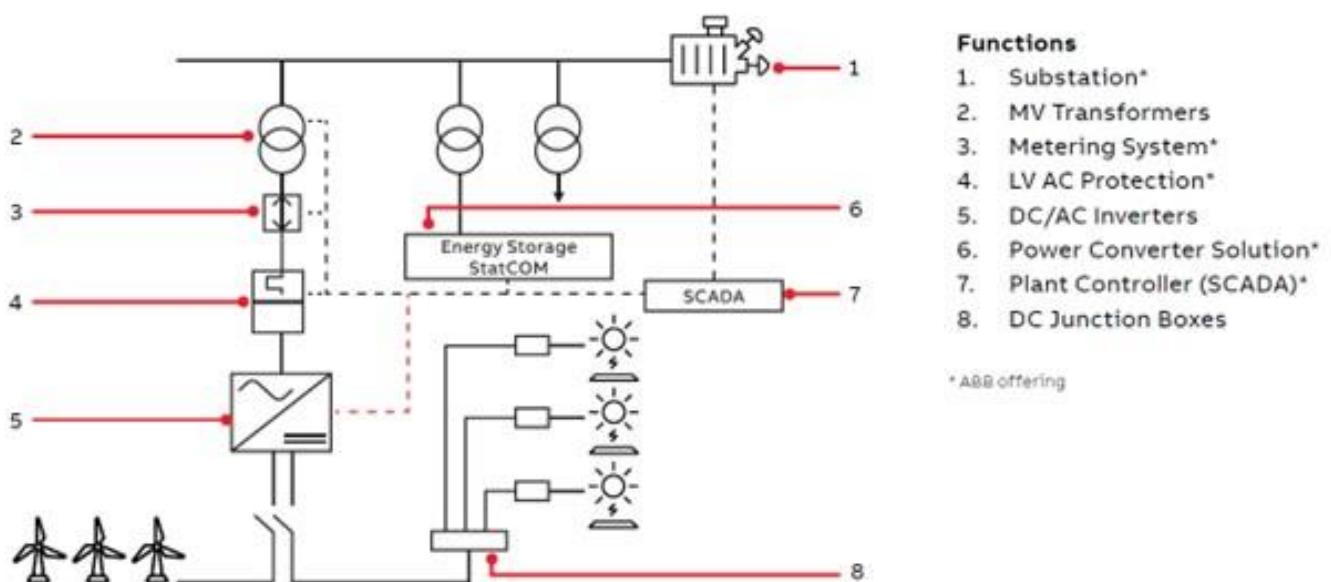
#### What are the Learning Area Objectives?

To understand:

- How to apply Direct Current (DC) technologies while designing energy distribution solution(s)
- How to minimize power conversion steps to improve energy efficiency, ease integration of renewable generation sources and battery storage, and increases operational reliability.
- DC microgrids to improve resilience and able to operate while connected to the main grid or independently using local generation and storage.

#### What are the suggestions/examples to apply this learning on-the-job?

- Apply Direct Current (DC) technologies/components like DC Breaker, DC/AC Inverters, Power Converters while designing energy distribution solution(s).



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## Off-the-job development opportunities for Learning Area - Direct Current (DC) Systems

Learning Area Topic	Course Code	Link (if any)
Direct Current Systems		<a href="https://new.abb.com/low-voltage/direct-current-systems">https://new.abb.com/low-voltage/direct-current-systems</a>
DC Traction Power Supply		<a href="https://new.abb.com/medium-voltage/switchgear/railway-switchgear/dc-traction-power-supply">https://new.abb.com/medium-voltage/switchgear/railway-switchgear/dc-traction-power-supply</a>
Introduction to Direct Current Applications	9CSC014143-GLB-EN	<a href="https://mylearning.abb.com/coursepage/30878">https://mylearning.abb.com/coursepage/30878</a> enUS/ExpertusONE 1
Topologies of Direct Current Networks	9CSC014968-GLB-EN	<a href="https://mylearning.abb.com/coursepage/31702">https://mylearning.abb.com/coursepage/31702</a> enUS/ExpertusONE 1
Exploring DC Converter's Internal Architecture	9CSC015536-GLB-EN	<a href="https://mylearning.abb.com/coursepage/32207">https://mylearning.abb.com/coursepage/32207</a> enUS/ExpertusONE 1
Exploring DC Converter's behavior during fault	9CSC015695-GLB-EN	<a href="https://mylearning.abb.com/coursepage/32357">https://mylearning.abb.com/coursepage/32357</a> enUS/ExpertusONE 1
S1576e – Enviline™ Traction Rectifiers	9CSC016888-GLB-EN	<a href="https://mylearning.abb.com/coursepage/33356">https://mylearning.abb.com/coursepage/33356</a> enUS/ExpertusONE 1
Enviline™ DCGear	9CSC007158-GLB-EN	<a href="https://mylearning.abb.com/coursepage/21921">https://mylearning.abb.com/coursepage/21921</a> enUS/ExpertusONE 1
Medium voltage Uninterruptible Power Supply (UPS)		<a href="https://new.abb.com/ups/systems/medium-voltage-ups/hiperguard">https://new.abb.com/ups/systems/medium-voltage-ups/hiperguard</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”



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### 3.8 Packaging Solutions II

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Packaging Solutions II	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver preconfigured, standardized, scalable and replicable solutions that meet customers' needs and expectations with shorter lead times, a smoother startup, and less risk.

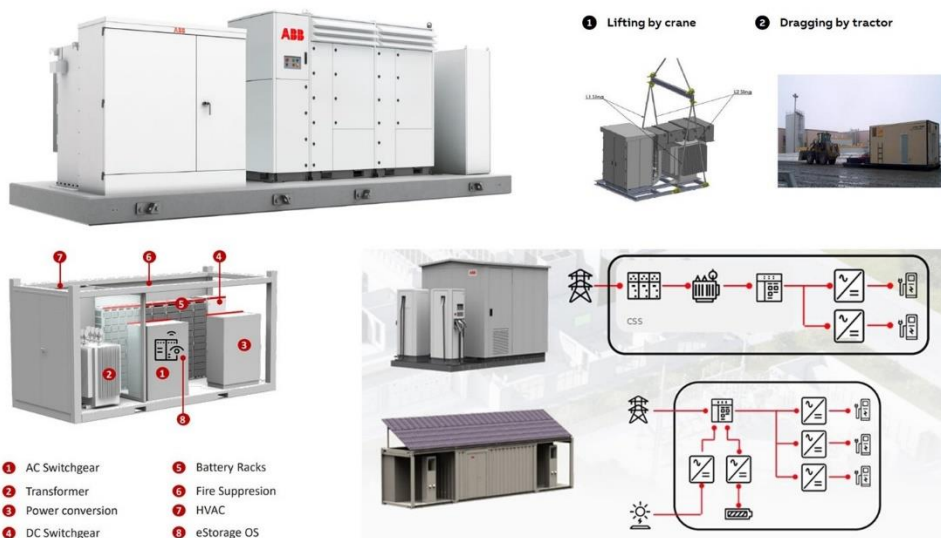
#### What are the Learning Area Objectives?

To understand the modular prefabricated solutions:

- Structure of Skid – enclosure and transportation facility (lifting by crane, dragging by tractor)
- How to select and design skid based and e-House based solutions
- Challenges involved while designing, installing, and integrating modular prefabricated solutions.

#### What are the suggestions/examples to apply this learning on-the-job?

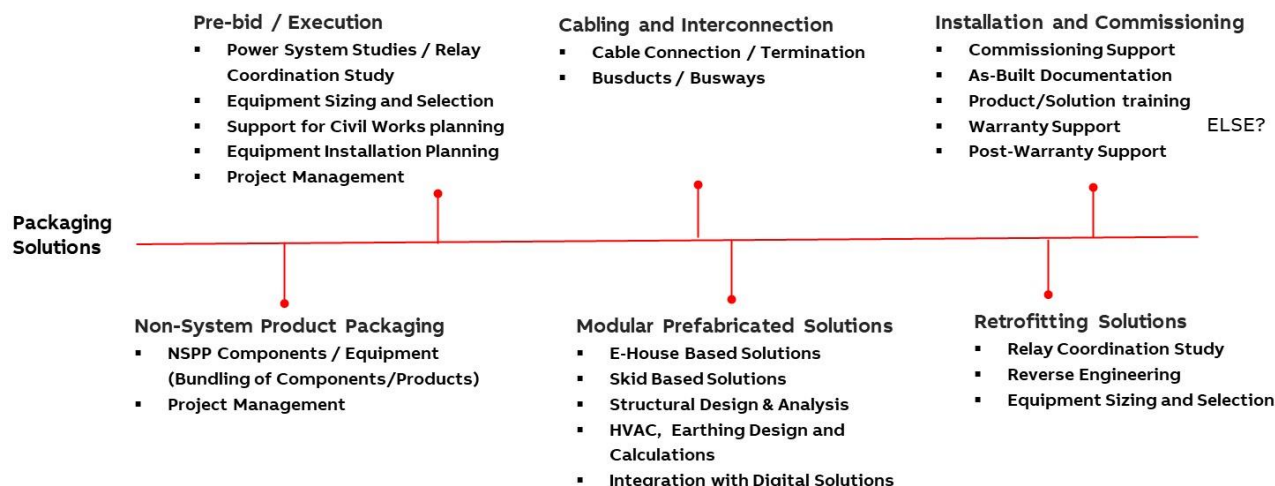
- Understand and document the functional requirements for designing “modular prefabricated solutions” to meet the contractual obligations, customers' needs and expectations.
- Participate in Integrated Test, Commissioning and Site Acceptance Test (Test) to understand and meet the contractual obligations, customers' needs and expectations.
- Compile a list of situations including photos of “modular prefabricated solutions” from shopfloor/site to where we had major quality, safety and/or cyber-security related design issues, and how they are mitigated. Discuss with engineering team and develop peer-review check lists to prevent such instances.





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## Off-the-job development opportunities for Learning Area - Packaging Solutions II



Learning Area Topic	Course Code	Link (if any)
Packaging Solutions Overview		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions">https://new.abb.com/medium-voltage/packaging-and-solutions</a>
Skid Solutions		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/industrial-unit-substations">https://new.abb.com/medium-voltage/packaging-and-solutions/industrial-unit-substations</a>
eHouses	9CSC015498-GLB-EN	<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/electrical-houses">https://new.abb.com/medium-voltage/packaging-and-solutions/electrical-houses</a>
Data Center Solutions	9CSC016319-GLB-EN	
EL Data Center Solutions – Technical Training Path	9TPC001721-GLB-EN	<a href="https://mylearning.abb.com/learningpage/2442_enUS/ExpertusONE_1">https://mylearning.abb.com/learningpage/2442_enUS/ExpertusONE_1</a>
Energy Storage Solutions / Energy Storage Systems		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/energy-storage-solutions">https://new.abb.com/medium-voltage/packaging-and-solutions/energy-storage-solutions</a>
Introduction to Energy Storage Modules	9CSC009359-GLB-EN	<a href="https://mylearning.abb.com/coursepage/23913/ExpertusONE_1">https://mylearning.abb.com/coursepage/23913/ExpertusONE_1</a>
ABB Solutions for Solar Segment – Energy Storage and Plant Monitoring	9CSC014232-GLB-EN	<a href="https://mylearning.abb.com/coursepage/30967/ExpertusONE_1/class/9CSC014232e-GLB-EN*%7C*enUS">https://mylearning.abb.com/coursepage/30967/ExpertusONE_1/class/9CSC014232e-GLB-EN*%7C*enUS</a>
Battery Energy Storage Systems Fault Analysis and Protection Architecture	9CSC018638-GLB-EN	<a href="https://mylearning.abb.com/coursepage/34856/ExpertusONE_1">https://mylearning.abb.com/coursepage/34856/ExpertusONE_1</a>
Battery Energy Storage Systems, Drivers, Trends Typologies	9CSC018439-GLB-EN	<a href="https://mylearning.abb.com/coursepage/34695_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/34695_enUS/ExpertusONE_1</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.9 Cyber-Security for Operational Technology (OT)

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Cyber-Security for Operational Technology (OT)	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to Identify and deliver cyber-secure solutions that meet business needs and add value to customer.

#### What are the Learning Area Objectives?

To understand:

- IEC62443 –3- 2; IEC62443 –3- 3; and IEC62443 -4- 2 while implementing Digital Solutions
- Reference Architecture; and where to place firewalls
- How to apply “Hardening” for Customers’ IT infrastructure to meet ABB MCSR.

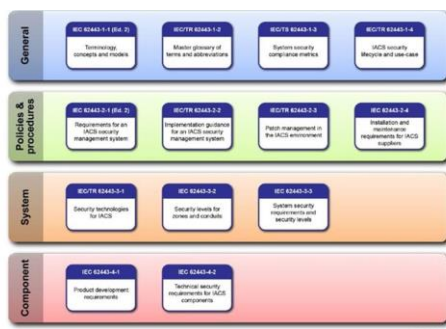


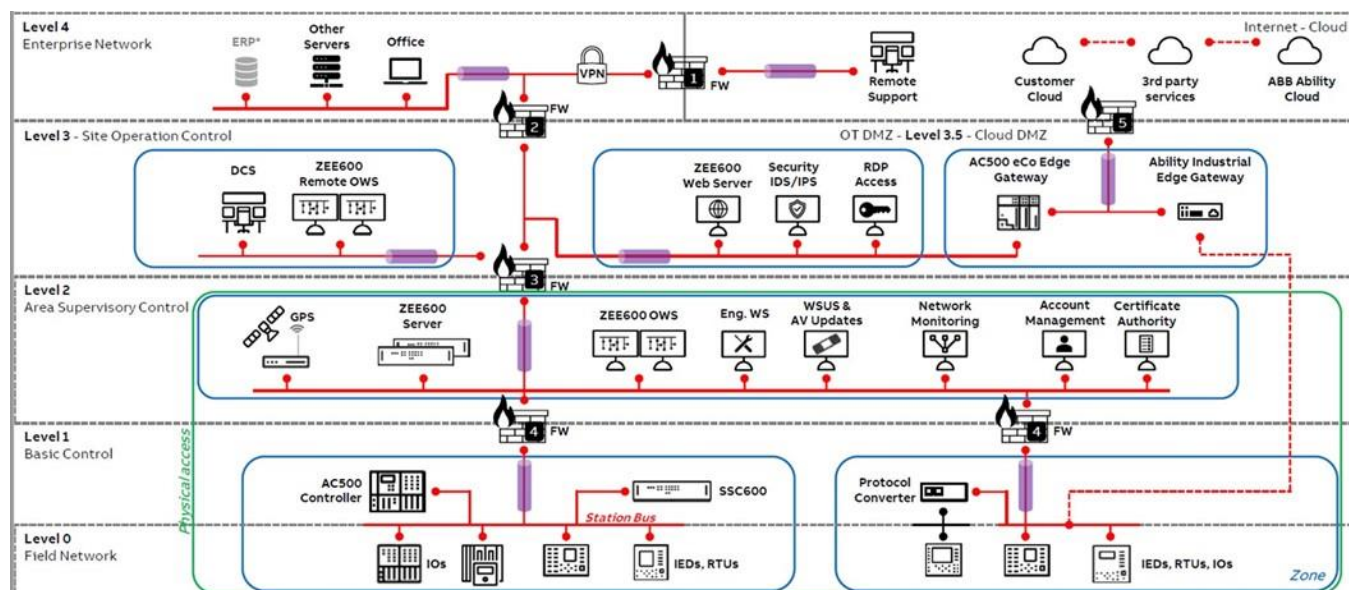
Figure 1 – Structure of the IEC 62443 series

#### What are the suggestions/examples to apply this learning on-the-job?

- Define “secure-by-design principles” as part of Design Freeze with Customer to meet Contractual requirements
- Apply ABB Minimum Cyber Security Requirements (MCSR) for Projects to meet contractual obligations
- Incorporate “secure-by-design principles” as part of Engineering Deliverables
- Document the “reference architecture” with appropriate placement of firewalls in the Operational Technology (OT) layers
- Perform Project Peer Reviews to ensure “secure-by-design principles” are incorporated
- Ensure references to "information classification and handling for confidentiality" as part of document distribution and filing
- Impart training and coach project team towards cyber-secure working practices
- Apply “Hardening” to Customers’ IT infrastructure
- Ensure the cyber security sign-off and hand-over with the customer.

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## Off-the-job development opportunities for Learning Area - Cyber-Security for OT



Learning Area Topic	Course Code	Link (if any)
Cybersecurity essentials		<a href="https://abbtv.inside.abb.com/2021/07/27/it-works-podcast-14-cybersecurity-essentials-are-you-an-easy-target">https://abbtv.inside.abb.com/2021/07/27/it-works-podcast-14-cybersecurity-essentials-are-you-an-easy-target</a>
Protecting data with unsurpassed industrial-strength cybersecurity		Search in ABB Library: 9AKK107680A4858 <a href="https://search.abb.com/library/Download.aspx?DocumentID=9AKK107680A4858&amp;LanguageCode=en&amp;DocumentPartId=&amp;Action=Launch">https://search.abb.com/library/Download.aspx?DocumentID=9AKK107680A4858&amp;LanguageCode=en&amp;DocumentPartId=&amp;Action=Launch</a>
Cyber Security Reference Architecture - Practices from Process Automation		<a href="https://abbtv.inside.abb.com/2021/03/26/webinar-recording-cyber-security-reference-architecture">https://abbtv.inside.abb.com/2021/03/26/webinar-recording-cyber-security-reference-architecture</a> <a href="https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-introduction-part-1">https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-introduction-part-1</a> <a href="https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-foundational-principles-part-2">https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-foundational-principles-part-2</a> <a href="https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-implementation-examples-part-3">https://abbtv.inside.abb.com/2021/07/22/abb-ics-cyber-security-reference-architecture-implementation-examples-part-3</a>
ABB Minimum Cyber Security Requirement (MCSR)	9CSC021793-GLB-EN	<a href="https://go.insideplus.abb.com/corporate-functions/research-and-development/cyber-security/standards">https://go.insideplus.abb.com/corporate-functions/research-and-development/cyber-security/standards</a>
2 NG A 0 0 1 8 0 1 zenon directory permissions and internal function issues		Search in ABB Library: 2NGA001801 <a href="https://search.abb.com/library/Download.aspx?Action=Launch&amp;DocumentID=2NGA001801&amp;DocumentPartId=&amp;LanguageCode=en&amp;Doc_gac=7.219891088.2067879716.14890146773.15114511808.16866275905">https://search.abb.com/library/Download.aspx?Action=Launch&amp;DocumentID=2NGA001801&amp;DocumentPartId=&amp;LanguageCode=en&amp;Doc_gac=7.219891088.2067879716.14890146773.15114511808.16866275905</a>
AC500 Cyber Security		Search in ABB Library: ADR010317 <a href="https://search.abb.com/library/Download.aspx?DocumentID=3AD010317&amp;LanguageCode=en&amp;DocumentPartId=&amp;Action=Launch">https://search.abb.com/library/Download.aspx?DocumentID=3AD010317&amp;LanguageCode=en&amp;DocumentPartId=&amp;Action=Launch</a>
COM600S 4.1 Cyber Security	S1507e	
ISA 62443 Fundamentals; and linking to Functional Safety		IEC 62443 IEC 61511

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.10 Digital Solutions Design and Implementation II

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Digital Solutions Design and Implementation II	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver digital solutions that meet customers' needs and expectations.
- I will be able to apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe and cyber-secure results/solutions.

#### What are the Learning Area Objectives?

To understand:

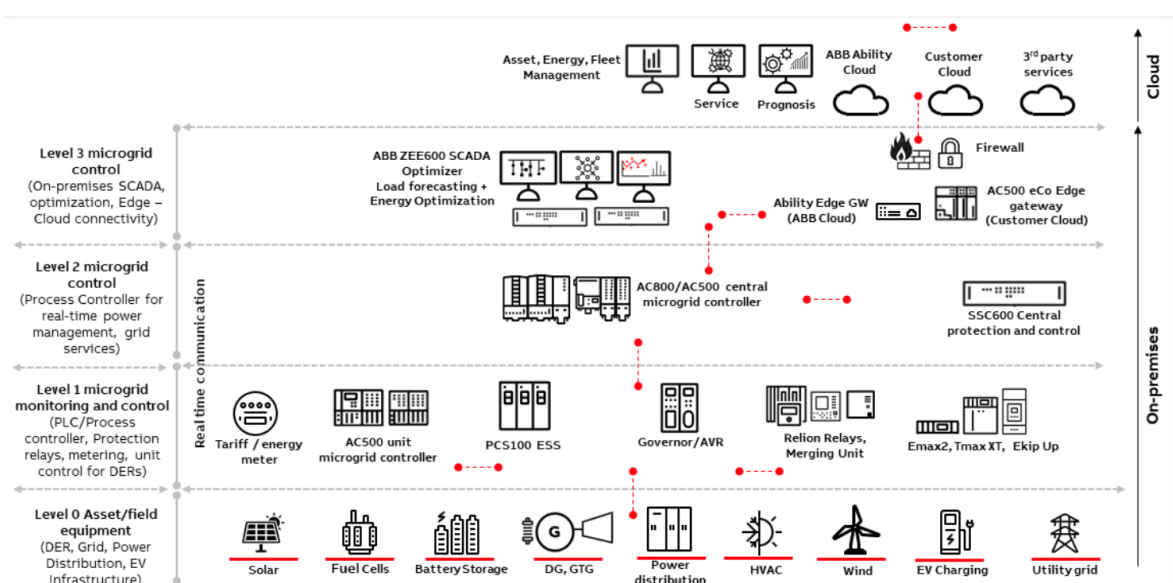
- Cybersecurity, Digital Solutions, Internet of Things (IOT) and analytics that provide our customers with shorter lead times, a smoother startup, and less risk.

#### What are the suggestions/examples to apply this learning on-the-job?

- Document the case-study and share (e.g., Acciona Energia documented in ABB Library as 2NGA001502)

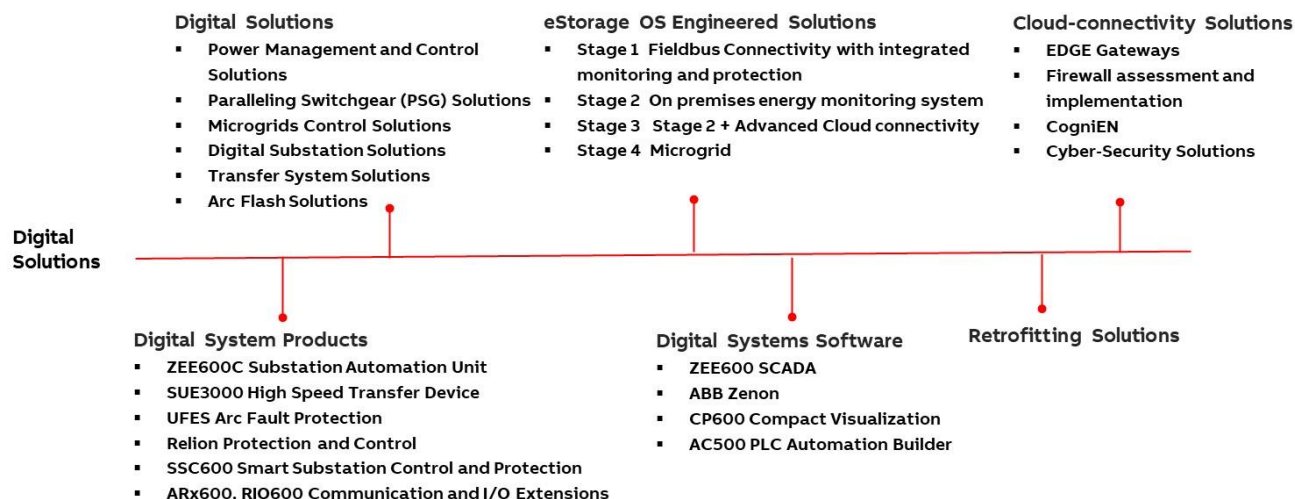
<https://search.abb.com/library/Download.aspx?DocumentID=2NGA001502&LanguageCode=en&DocumentPartId=&Action=Launch>

- Understand and document the functional requirements for designing "Digital solutions" to meet the contractual obligations, customers' needs and expectations.
- Participate in Integrated Test, Commissioning and Site Acceptance Test (Test) to meet the contractual obligations, customers' needs and expectations.



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## Off-the-job development opportunities for Learning Area - Digital Solutions Design & Implementation II



Learning Area Topic	Course Code	Link (if any)
Digital Solutions Overview		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems</a>
Power System Protection practices		<a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
Digital Solutions for Medium Voltage and Low Voltage	9CSC013840-GLB-EN	<a href="https://mylearning.abb.com/coursepage/30564_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/30564_enUS/ExpertusONE_1</a>
ABB Ability™ Edge Industrial Gateway		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/digital/abb-ability-edge-industrial-gateway">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/digital/abb-ability-edge-industrial-gateway</a>
Power Management and Control Solutions		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions</a>
Paralleling Switchgear (PSG) Solutions		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions/paralleling-switchgear">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions/paralleling-switchgear</a>
SSC600 Digital twin		
High speed bus transfer system using REX640		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/bus-transfer-solutions">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/bus-transfer-solutions</a>
Peterson coil application		
eStorage OS		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions/estorage-os-engineered-solution">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/power-management-and-control-solutions/estorage-os-engineered-solution</a>
Cloud solution CogniEN		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/cognien">https://new.abb.com/medium-voltage/packaging-and-solutions/digital-systems/cognien</a>
Distribution Automation Manager ADAM		<a href="https://new.abb.com/medium-voltage/digital-substations/software-products/adam-fleet-management">https://new.abb.com/medium-voltage/digital-substations/software-products/adam-fleet-management</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”



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### 3.11 Power Systems Studies

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Power Systems Studies	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver protection solutions that meet customers' needs and expectations.

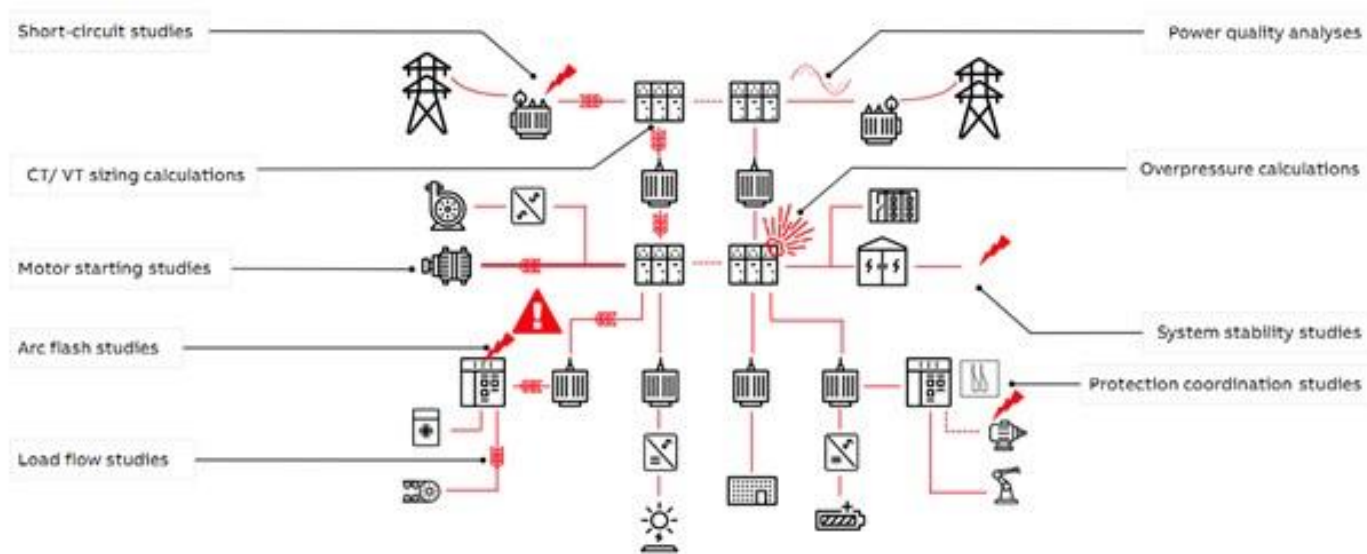
#### What are the Learning Area Objectives?

To understand:

- Industrial network. From HV to LV Power system
- General – Fault calculation, short circuit current calculation
- Relay Coordination Methodology
- Protection solutions that meet business needs and add value to customer

#### What are the suggestions/examples to apply this learning on-the-job?

- Study a report related to "Power Systems Studies", and understand how it impacts the design of Low Voltage System(s) e.g., Relay Settings
- Volunteer to participate in "Power Systems Studies".



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### Off-the-job development opportunities for Learning Area - Power Systems Studies

Learning Area Topic	Course Code	Link (if any)
Power System Studies		<a href="https://new.abb.com/medium-voltage/packaging-and-solutions/power-studies-and-consulting">https://new.abb.com/medium-voltage/packaging-and-solutions/power-studies-and-consulting</a>  <a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions/power-studies-and-consulting">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions/power-studies-and-consulting</a>
Power System Protection practices		<a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
ABB Switchgear Manual		<a href="https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual">https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual</a>
Power Quality		<a href="https://new.abb.com/low-voltage/launches/power-quality">https://new.abb.com/low-voltage/launches/power-quality</a>
Arc-flash Protection and Mitigation		<a href="https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation">https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation</a>
DC circuit breakers coordination. upstream/downstream: rules and standards related. AC Circuit breakers inside DC network: magnetic curves deviations.		IEC 61660-1 (SC calculation)

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 3.12 Segment-specific Energy Distribution Solutions

Competency	Learning Area	Applicability
Engineering Solutions	Energy Distribution Solutions	Senior Project Engineer and above

**What's is the motivations for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

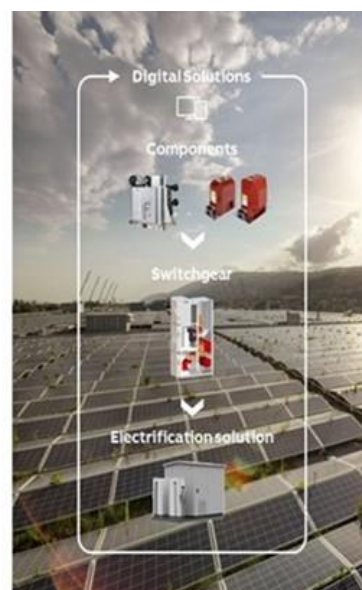
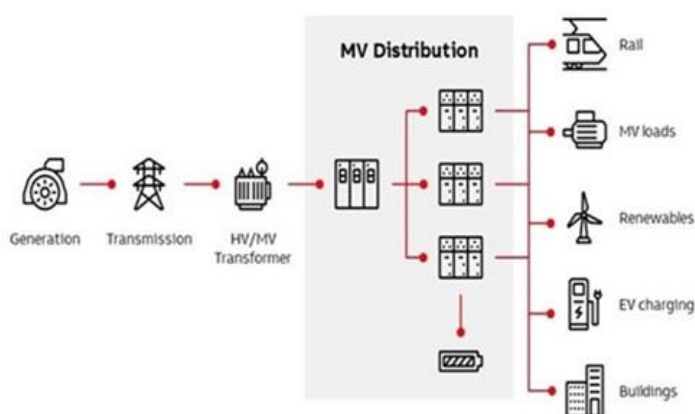
- I will be able to identify, improve and deliver “Safe, Smart and Sustainable” Energy Distribution Solutions that meet Customers’ needs and expectations.

**What are the Learning Area Objectives?**

- To understand “Energy Distribution challenges and solutions” for different segments.

**What are the suggestions/examples to apply this learning on-the-job?**

- Participate in best practice sharing sessions.
- Create Personas to understand segment-specific stakeholders’ pain areas, needs and expectations.
- Identify market trends and likely needs and expectations of the customers
- Actively engage with Business Development team to learn a new segment / application.
- Reduce complex situations to a few core priorities in pursuit of major strategic objectives
- Anticipate challenges and opportunities from the perspectives of different cultures and nationalities
- Formulate clear, practical approaches to meet the future objectives of the stakeholders, business vision and change in circumstances





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### Off-the-job development opportunities for Learning Area - Energy Distribution Solutions

Learning Area Topic	Course Code	Link (if any)
Customer Segments		<a href="https://new.abb.com/medium-voltage/by-customer-segment">https://new.abb.com/medium-voltage/by-customer-segment</a>
Rail		<a href="https://new.abb.com/railway/railway/abb-products-and-solutions-for-infrastructure-electrification">https://new.abb.com/railway/railway/abb-products-and-solutions-for-infrastructure-electrification</a>
Renewables		
E Mobility and EV Charging		<a href="https://smartsocieties.abb.com/#/en/smart_city_h/e_mobility">https://smartsocieties.abb.com/#/en/smart_city_h/e_mobility</a>
Budlings		
Data Centers		<a href="https://smartsocieties.abb.com/#/en/smart_city_h/data_center">https://smartsocieties.abb.com/#/en/smart_city_h/data_center</a> <a href="https://new.abb.com/data-centers">https://new.abb.com/data-centers</a>
Airports		<a href="https://smartsocieties.abb.com/#/en/smart_city_h/airports">https://smartsocieties.abb.com/#/en/smart_city_h/airports</a>
Water		<a href="https://smartsocieties.abb.com/#/en/smart_city_h/water">https://smartsocieties.abb.com/#/en/smart_city_h/water</a>
Digital grids		
Grid Automation - Smart power distribution solutions		<a href="https://new.abb.com/medium-voltage/distribution-automation/grid-automation-solutions">https://new.abb.com/medium-voltage/distribution-automation/grid-automation-solutions</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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## 4 Processes and Tools to enhance customer experience

### 4.1 Engineering Design Tools and Applications

Competency	Learning Area	Applicability
Engineering Processes and Tools	Engineering Design Tools and Applications	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to apply my knowledge of analytics and digitization, and improve engineering deliverables, and administrative processes, tools in a systematic and structured way.
- I will be able to align these to external standards and contractual obligations and manage deliverable documentation so that optimal results are achieved with defined contents, deadlines, and budget.

#### What are the Learning Area Objectives?

To understand the process and tools:

- Engineering data flow and deliverables overview
- Division instructions and guidelines for creating engineering deliverables
- Load list, Single Line Diagram (SLD)
- Configurators e.g. Empower/Rulestream, Treffo,
- MVE
- EPLAN Electric P8; EPLAN ProPanel; SolidWorks / Creo and Autocad (Autodesk)
- SAP

#### What are the suggestions/examples to apply this learning on-the-job?

- Actively utilize Switchgear Configurator, EPLAN Electric P8 for electrical design, SolidWorks /CREO for mechanical design.
- Compile a list of complex protection schemes and discuss with the engineering team.
- Compile a list of complex DTOs and discuss with the engineering team.
- Collaborate with procurement and manufacturing with an aim to reduce overall lead time and improve the quality of deliverables e.g., BOM and manufacturing documentation to support the Single-piece -flow.
- Validate the Bill of Materials (BOM) before uploading to ERP (SAP).
- Actively participate in Peer Reviews / Design Verification Reviews

Basic Engineering/Design	Detailed Engineering/Design	Release Manufacturing Drawings Update As-built Documentation Technical Closure
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Discipline	Tool/ Application	Typical Deliverables /Outputs
Electrical Engineering	EPLAN Electric P8 EPLAN Pro Panel (only selected factories)	Single Line Diagram Earthing Diagram Electrical Schematics Product configuration or BOM of electrical components Wiring Tables / Cable Diagram Labeling Exports
Mechanical Engineering	SolidWorks CREO (only for ANSI markets) EPLAN Pro Panel (only selected factories)	Skid / e-House Layout Diagram GA Diagram and Sectional Views 3D Modelling (where required for feasibility checks) MV Switchgear Front view diagram Part and assembly drawings / Product configuration or BOM of mechanical components Low Voltage Compartment (LVC) Layouts Door Layouts DTO Drawings

### Off-the-job development opportunities for Learning Area - Engineering Design Tools and Applications

Learning Area Topic	Course Code	Link (if any)
Configurators		<a href="https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-sales/elds-global-configurators">https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-sales/elds-global-configurators</a>
MVE		<a href="https://abb.sharepoint.com/sites/MveDev">https://abb.sharepoint.com/sites/MveDev</a>
Electrical CAD		<a href="https://www.eplan-software.com/solutions/eplan-electric-p8/">https://www.eplan-software.com/solutions/eplan-electric-p8/</a>
Mechanical CAD		<a href="https://www.solidworks.com/">https://www.solidworks.com/</a>
Division Instructions and Guidelines		2NAA000001 Application of ABB-Identity Numbers for Articles and Documents in ELDS 2NBA000001 Reference Designation of objects for electrical documents in DIVISION PPMV 2NDA000001 Rules for documents of electrical engineering in Eplan projects 2NAA000029 Rules for global parts database of Switchgears in PPMV 2NAA000043 EDR / ECR and DTO Control Policy 3WYR000001 Classification of secondary material for Eplan Projects in DIVISION PPMV

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning” related to Local IT Landscape.

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## 4.2 Safety in Design

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Safety in Design	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and “Safe, Smart and Sustainable” distribution solutions.

### What are the Learning Area Objectives?

To understand:

- How to ensure safety, cyber-security and sustainability is embedded as part of the solution
- Arc Flash Protection and Mitigation solutions
- Fail-Safe Design principles and practices
- Functional Safety according to IEC 61511

### What are the suggestions/examples to apply this learning on-the-job?

- Apply “Safety in Design” as part of Design Freeze to meet Contractual requirements. e.g.
  - Where to utilize “Normally Open (NO) / Normally Closed (NC) Contacts”
  - Assessment of Breaking and Protection solution(s); Power System Protection practices
  - Assessment of Arc Flash Protection and Mitigation solution(s)
  - Understanding civil construction layout restrictions like pillars, beams, space constraints before finalizing the Switchgear panel layouts and General Assembly drawings.
  - Understanding cable size and cable termination requirements to ensure whether the glanding requirements are taken care appropriately.
  - Placement of lifting brackets, length of the four-part lifting chain/sling while designing structure of skid considering the center of gravity, weight of the components, and size of the skid.
  - How do we meet sustainability requirements of ABB and our Customers? E.g.
    - How do we assure we do not use „Conflict Minerals “as part of the design process?
    - How do we assure we do not use ABB List of Prohibited and Restricted Substances as part of packing and delivery?
    - Utilization of products that have “Environmental Product Declarations” (EPDs)
- Compile a list of situations including photos from shopfloor/site to demonstrate major quality, safety and/or Cyber Security related design issues, and share with engineering team.
- Compile a list of complex protection schemes and discuss with the engineering team.
- Compile a list of complex DTOs and discuss with the engineering team.

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## Safety in Design

The “Safety in Design” is an approach to system design and operation that aims to minimize the potential for harm or failure in the event of a malfunction or other issue. Individuals should:

- clearly understand the objectives of the design process – what the problem/energy distribution solution that is being solved – so potential alternative options can be considered
- design processes that include multiple layers of peer reviews, design verification reviews, prototyping and testing to ensure that the solutions will function correctly
- refer to external specifications (for example, legislation, regulations, codes of practice and standards)
- refer to internal specifications (such as engineering guidelines, policies, or procedures)
- agree on the protocol to follow should deviation from those standards be necessary
- consider how our design will affect the health, safety, environment, and sustainability of stakeholders who will interact with our Energy Distribution Solution(s) throughout its life cycle
- thinking about design solutions for identified hazards and reasonably foreseeable risks that may occur as our solution is manufactured, transported, installed, serviced, and disposed of
- consider the behavior of design components in context of the product/solution life span – for example, how often a component might fail during the product/solution life and the potential impacts of such failures
- consider post-life aspects through the elimination or minimization of exposure to toxic or environmentally damaging materials designed into the product
- regularly monitor systems and processes to detect potential issues before they cause harm
- respond quickly and effectively to resolve any problems that do arise.

## Off-the-job development opportunities for Learning Area – Safety in Design

Learning Area Topic	Course Code	Link (if any)
Power System Protection practices		<a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
Arc-flash Protection and Mitigation		<a href="https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation">https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation</a>
IEC Arc Flash Protection and Mitigation Solutions	9CSC014431-GLB-EN	<a href="https://mylearning.abb.com/coursepage/31143_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/31143_enUS/ExpertusONE_1</a>
ANSI/UL Arc Flash Protection and Mitigation Solutions	9CSC014901-GLB-EN	<a href="https://mylearning.abb.com/coursepage/31629_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/31629_enUS/ExpertusONE_1</a>
S839e - IAC requirements IEC 62271-202 - EN	S839e-GLB-EN	<a href="https://mylearning.abb.com/coursepage/8166/ExpertusONE_1">https://mylearning.abb.com/coursepage/8166/ExpertusONE_1</a>
S1562e – IEC 62271-200	S1562e	<a href="https://mylearning.abb.com/coursepage/27984/ExpertusONE_1">https://mylearning.abb.com/coursepage/27984/ExpertusONE_1</a>
Appreciation of Functional Safety during the Solution Design and Implementation		IEC 61511

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 4.3 Design Thinking

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Design Thinking	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to understand customers' needs, pain areas, and expectations.
- I will be able to identify and deliver engineering solutions that meet customers' needs and expectations.

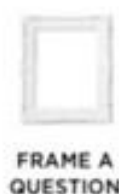
#### What are the Learning Area Objectives?

To understand what Design Thinking is and how to apply:

- Design Thinking - a systematic, human-centric approach of problem solving.
- Design thinking and doing to improve the Customer Experience while delivering the solutions.
- the process of design thinking - Define the problem, Empathize, Ideate, Prototype and Test.

#### What are the suggestions/examples to apply this learning on-the-job?

- Create Personas to understand stakeholders' pain areas, needs and expectations.
- Conceptualize the engineering solutions based on customer needs and expectations and convert them into design.
- Create a working prototype of a full-scale engineering design solution and test its performance against all predefined standards before rolling it out to the full-scale design and engineering.
- Improve the Customer experience while delivering the solutions by applying design thinking techniques e.g. Empathy Maps, Creative Process.



Source for "The Phases of Design Thinking": <https://www.ideo.com/pages/design-thinking-resources>

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## Off-the-job development opportunities for Learning Area - Design Thinking

Design thinking involves the application of design thinking principles to the engineering design process. individuals should:

- Understand customer/end user requirements, pain-points, needs and expectations.
- Create solutions that meet those needs and expectations.
- Utilize prototyping, testing, and iterative design processes to refine solutions.
- Generate and test new ideas, utilize data and feedback to improve designs.

One of best learning on the design thinking process is by studying how to build a “Shopping Cart” in five days. This process is documented by IDEO, one of the World’s best Innovation and Design Thinking companies. Following is a link to a 22-minute video how the shopping cart design process is captured and telecasted by ABC News. More details of it is documented in “The Art of Innovation” by Tom Kelley.

[IDEO: Shopping Cart Design Process - YouTube](#) (or)

<https://www.youtube.com/watch?v=izjhx17NuSE>

Here are few simple videos on Design Thinking from **inside.abb** to cover the key steps of Design Thinking:

Define - Empathize – Ideate – Prototype (each of these videos are about 2 minutes each)

<https://abbtv.inside.abb.com/2017/11/21/design-thinking-define>

<https://abbtv.inside.abb.com/2017/11/21/design-thinking-empathize>

<https://abbtv.inside.abb.com/2017/11/21/design-thinking-ideate>

<https://abbtv.inside.abb.com/2017/11/21/design-thinking-prototype>

One of the best books related to topic:

Design Thinking Playbook written by Michael Lewrick, Patrick Link, Larry Leifer

Additional information from IDEOU. Please make utilization of **free resources available** in this link to further develop this capability in our Project and Requisition Engineering team.

Please study the following from <https://www.ideou.com/pages/design-thinking-resources>

1. Desirability, Feasibility and Viability
2. The Creative Process
3. Empathy Maps
4. The Phases of Design Thinking



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#### 4.4 Data Driven Insights

Competency	Learning Area	Applicability
Engineering Processes and Tools	Data Driven Insights	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to apply my knowledge of analytics and digitization, and improve engineering deliverables, and administrative processes, tools in a systematic and structured way.

#### What are the Learning Area Objectives?

To understand:

- How to improve the project efficiency or engineering processes, based on Data Analytics during Switchgear Engineering e.g., Handling of Load-list Changes; Handling of BOM Updates
- How to apply data analytics and digitalization on a portfolio of projects; and develop insights.
- How to apply data driven insights to deliver value and delight to our customers.
- Creating standard and/or best practice solutions to ensure quality and reduce engineering lead time.

#### What are the suggestions/examples to apply this learning on-the-job?

- Organize data and information required to complete the tasks and projects.
- Analyze data and information in a logical and systematic way .
- Apply Microsoft Excel skills related VLOOKUP function, Pivot table ...
- Understand of how decisions may be perceived by people from different cultures and/or nationalities.
- Use data and insights to make a point persuasively.
- Ensure decisions are guided by data and insights.
- Perform Data Analytics utilizing a project data e.g., Load List changes and determine the impact for project changes.
- Perform Data Analytics on a portfolio of projects, and present a report based on insights from the data.

#### Off-the-job development opportunities for Learning Area - Data Driven Insights

Learning Area Topic	Course Code	Link (if any)
Digital Intelligence		<a href="https://abb.myhbp.org/hmm12/courses.html">https://abb.myhbp.org/hmm12/courses.html</a> Search for Digital Intelligence
Data Analysis utilizing Excel		
Power BI		<a href="https://esi.microsoft.com?delid=35902">https://esi.microsoft.com?delid=35902</a> <a href="https://esi.microsoft.com?delid=35949">https://esi.microsoft.com?delid=35949</a>

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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#### 4.5 Design Verification

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Design Verification according to IEC/ANSI standards	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify and deliver solutions that meet requisite standards, contractual obligations, customers' needs and expectations.

#### What are the Learning Area Objectives?

To understand:

- The methodology utilized for Design verification e.g., Calculation, independent assessment, peer reviews
- How to perform Design Verification acc. IEC/IEEE/ANSI/UL/GB Standards

#### What are the suggestions/examples to apply this learning on-the-job?

- Identify any contractual obligations related to non-standard site conditions / installation requirements, Type Test, Routine Test & Functional Test requirements.
- Participate in a design verification meeting according to IEC/IEEE/ANSI/UL/GB standards.
- Complete design verification according to IEC/IEEE/ANSI/UL/GB standards or as per Checklists.
- Perform design verification according to the latest Engineering Guidelines published by Global R&D team.
- Perform design verification before the "Design Freeze" along with the customer; and enable the "Design Freeze" as early as possible during the execution of the project.
- Record the "Design Verification" preferably with a Meeting Notes or Minutes of Meeting (MOM) to carry out identified actions (if any).

#### Project Peer Reviews

The objective of Project Peer Reviews is to

- identify obstacles and mitigate to meet the contractual obligations.
- minimize rework during detailed engineering, manufacturing and testing.

Peer reviews to be performed multiple times (e.g. before Design freeze, uploading BOM to SAP, issue of manufacturing deliverables, and as-built documentation) by 'Subject-Matter Specialist' or Cross-functional team(s) in case of complex – projects to meet the needs and expectations of our customers.

Effectiveness of Project Peer Reviews are determined by:

- Number of internal Bill of Materials (BOM) Revisions
- Number of Work Authorizations identified during Manufacturing/ Testing

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## Design Verification

Design verification is intended to verify compliance of the design of an ASSEMBLY or ASSEMBLY system with the requirements of international standards (IEC/IEEE/ANSI/UL/GB..). Design verification may comprise one or more equivalent methods

- Verification testing like type Tests
- Verification comparison with a type tested reference design
- Verification assessment i.e confirmation of the correct application of calculations and engineering guidelines or design rules, including the use of appropriate safety margins

Design Verification shall comprise both construction and performance of the electrical system.

## Verification Test

Test(s) made on a sample of an ASSEMBLY or on parts of ASSEMBLIES to verify that the design meets the requirements of the relevant ASSEMBLY standard. Verification tests are equivalent to type tests.

## Verification Comparison

Structured comparison of a proposed design for an ASSEMBLY, or parts of an ASSEMBLY, with a reference design verified by type tests

## Verification Assessment

Design verification of strict design rules or calculations applied to a sample of an ASSEMBLY or to parts of ASSEMBLIES to show that the design meets the requirements of the relevant international ASSEMBLY standard(s)

## Routine Verification

Verification of each ASSEMBLY performed during and/or after manufacture to confirm whether it complies with the requirements of the relevant international ASSEMBLY standard(s)

## Guidance

1. Identify any contractual obligations related to non-standard site conditions / installation requirements, Type Test, Routine Test & Functional Test requirements.
2. Ensure that all contractual obligations are fulfilled, and the design criteria met as per technical specifications, Engineering Guidelines published by ELDS Technology Centers (if any) and applicable IEC/IEEE/ANSI/UL/GB standards.
3. Design verification shall ideally be performed before the „Design Freeze“ along with the customer.
4. Enable the “Design Freeze” as early as possible during the execution of the project.
5. The „Design Verification“ / „Project Peer Review“ shall be recorded preferably with a Meeting Notes or MOM to carry out identified actions (if any).

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### Off-the-job development opportunities for Learning Area - Design Verification

Learning Area Topic	Course Code	Link (if any)
Applicable Global Standards		<a href="https://go.insideplus.abb.com/tools-and-services/abb-standards/global-standards">https://go.insideplus.abb.com/tools-and-services/abb-standards/global-standards</a>
Power System Protection practices		<a href="https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook">https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook</a>
ABB Switchgear Manual		<a href="https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual">https://www.hitachienergy.com/de/de/products-and-solutions/substations/switchgear-manual</a>
IEC 62271-1	S785e	
S839e - IAC requirements IEC 62271-202 - EN	S839e-GLB-EN	<a href="https://mylearning.abb.com/coursepage/8166/ExpertusONE_1">https://mylearning.abb.com/coursepage/8166/ExpertusONE_1</a>
S1562e – IEC 62271-200: terms and definitions for MV switchgear	S1562e	<a href="https://mylearning.abb.com/coursepage/27984/ExpertusONE_1">https://mylearning.abb.com/coursepage/27984/ExpertusONE_1</a>
IEC Standards for Compact Substations (CSS)	S837e; S838e S839e	

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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#### 4.6 Agile / Lean Methodologies

Competency	Learning Area	Applicability
Engineering Solutions	Agile / Lean Methodologies	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify, improve and deliver engineering solutions that meet business needs and add value to customer by applying agile / lean methodologies.

#### What are the Learning Area Objectives?

To understand:

- How to create standard and/or best practice solutions to ensure consistent quality and reduce engineering lead time.

#### What are the suggestions/examples to apply this learning on-the-job?

Initiate / Lead an agile or Lean methodologies project e.g., reduce engineering lead time.

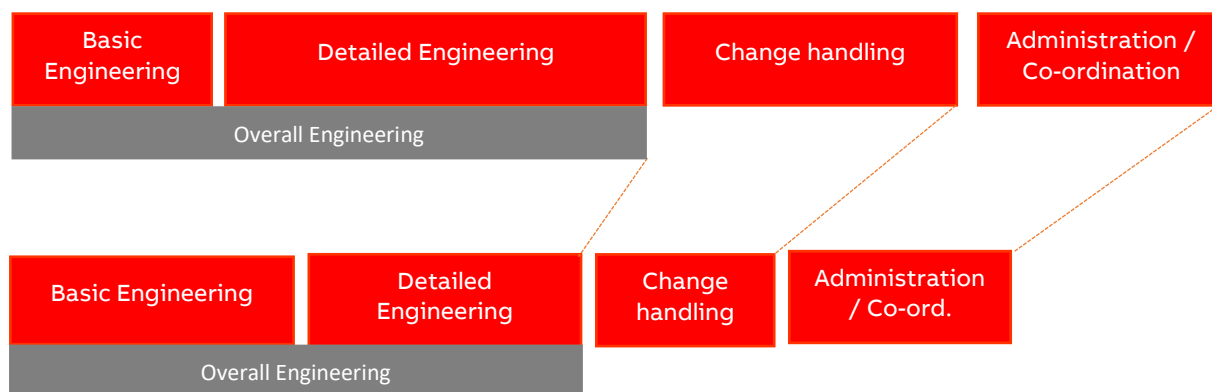
- Create Personas to understand stakeholders' pain areas, needs and expectations.
- Apply an iterative process of planning, executing, and evaluating.
- Proactively collaborate with stakeholders to meet the objectives of the phase or completion of tasks.
- Develop Proof of Concepts (POCs) or prototypes and seek feedback from stakeholders.
- Reflect and continually improve after every iteration.
- Proactively communicate relevant and key information and lessons learned to all stakeholders.
- Document and share the lessons learned from a Lean/Agile Methodologies project.

#### Being customer-centric through all touchpoints needs a Stakeholder view of Frustration and Expectations

Stake Holder	Typical Pain Points (Frustration)	Typical Expectations
Chief Executive Officer (CEO)	<ul style="list-style-type: none"> <li>Growth and KPI</li> <li>Profit</li> </ul>	Solutions that works as promised.
Project Manager	<ul style="list-style-type: none"> <li>Quality must be on point</li> <li>Deliver as promised</li> </ul>	Solutions that works and delivers as promised. To get the products in time with short lead times. Wants flexibility to be able to change with short notice. Might expect to get a bit more than promised.
Procurement Manager	<ul style="list-style-type: none"> <li>Right products sourced and purchased from reliable suppliers at the best price</li> <li>Getting the deliveries according to commitment</li> <li>Poor quality</li> <li>Poor product documentation</li> <li>Compliance</li> <li>Risk management</li> </ul>	<p>Right products and solutions/services are sourced and purchased from reliable suppliers at the best price.</p> <p>To get as much information about the products as possible. Examples</p> <ul style="list-style-type: none"> <li>who you currently work with,</li> <li>industries served,</li> <li>measurable quality standards,</li> <li>your supply chain capabilities, and</li> <li>certifications are desirable.</li> </ul> <p>Procurement must succeed, or the blame for a bad deal might fall on them.</p>
Maintenance Engineer	<ul style="list-style-type: none"> <li>Stopped production and unplanned downtime</li> <li>Reliability of equipment</li> <li>Maintenance budget control</li> <li>Extending the life cycle of the equipment</li> <li>Different switchgears with different designs</li> <li>Lacking spare parts</li> </ul>	Safe and Cyber-Secure Solutions that works and delivers as intended for a long and measurable time with minimum spares and maintenance.

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Engineering Excellence is one of the key ingredients for the success of any organization. Application of Agile and Lean Methodologies provides a framework to pursue such continuous improvement. Typically, the mindset during project execution would be to swiftly dive into detailed engineering phase and release manufacturing documentation including Bill of Materials (BOM). If the 'Design Freeze' is missed during Basic engineering with customer, the engineering time will be mostly spent in change handling or rework. Such situations can be avoided by spending satisfactory time during 'Basic Engineering and Design Freeze'.



Agile / Lean Engineering Concept

The Local Engineering Units are encouraged to implement Agile / Lean Methodologies projects related to deliver value and delight to our customers.

#### Off-the-job development opportunities for Learning Area - Agile / Lean Methodologies

Learning Area Topic	Course Code	Link (if any)
Design Thinking Playbook Written by Michael Lewrick, Patrick Link, Larry Leifer		

**Note:** The respective local Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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#### 4.7 Design for Excellence

Competency	Learning Area	Applicability
Engineering Solutions	Design for Excellence	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to identify, improve and deliver engineering solutions that meet business needs and add value to customer by applying Design for Excellence methods.

#### What are the Learning Area Objectives?

To understand:

- How to maximize the value to Customer?
- How to assure the engineering solution offered is meeting the Customer needs?
- How to ensure engineering solution meets all criteria (Cost, technical specifications, delivery, design for manufacturing, modular thinking, standards etc.)?
- How to ensure engineering solution is designed for safe, cyber-secure, reliable, and cost-effective manufacturing, installation, and commissioning, maintenance?
- How do we meet sustainability requirements of ABB and our Customers?

#### What are the suggestions/examples to apply this learning on-the-job?

Initiate a Design for Excellence project by collaborating with procurement and manufacturing with an aim to reduce overall lead time of engineering and manufacturing and improve the quality of deliverables.

- Study following from <https://www.ideou.com/pages/design-thinking-resources>
  - Desirability, Feasibility and Viability; The Creative Process; Empathy Maps; and The Phases of Design Thinking
- Create Personas to understand stakeholders' pain-areas, needs and expectations.
- Perform Data Analytics on a portfolio of projects related Manufacturing BOMs (MBOMs) to understand the utilization of parts; identify 20 to 25% of parts that can be in Stores/Kanban system as line-items or kits, and need not appear in MBOM; and present a report based on "insights from the data".
- Apply "Design Thinking" principles and propose a process to ensure MBOM, and manufacturing related deliverables supports the „lean manufacturing“ and/or „Single-piece -flow“.
- Document and share the lessons learned from the Design for Excellence project.

#### Off-the-job development opportunities for Learning Area - Design for Excellence

Learning Area Topic	Course Code	Link (if any)
ABB'S Design for Excellence (DFX) Awareness Training	9TPC002210-GLB-EN	<a href="https://mylearning.abb.com/learningpage/3079_enUS/ExpertusONE_1">https://mylearning.abb.com/learningpage/3079_enUS/ExpertusONE_1</a>



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## 5 Collaboration with Project Manager and Project Execution Team

### 5.1 Planning and Prioritizing

Competency	Learning Area	Applicability
Planning and Prioritizing	Planning and Prioritizing	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to
  - identify, improve, and deliver on-time and on-quality engineering solutions that meet customers' needs and expectations.
  - Create, and adjust plans in line with strategic goals and priorities coordinating with interrelated stakeholders and functions.

#### What are the Learning Area Objectives?

To understand:

- How to ensure that agreed commitments are delivered on-time?
- How to ensure clear, efficient, and timely completion of deliverables to ensure good results?

#### What are the suggestions/examples to apply this learning on-the-job?

- Study Customer's Contract, and discuss with Project Manager(s) and team:
  - What are the Stakeholders needs and expectations?
  - How do we meet their needs, priorities, and expectations with clear agreed timelines?
  - How can I prioritize the project deliverables, avoid multi-tasking, and meet the expectations of two or more Project Managers if I am involved multiple projects?
- Produce clear and comprehensive plans to achieve defined objectives and result.
- Prioritize tasks and projects according to their relative urgency and importance.
- Organize and manage time effectively.
- Follow tasks and projects through to completion and achieves result or defined objectives.

#### Off-the-job development opportunities for Learning Area - Technical Information Sharing

Learning Area Topic	Course Code	Link (if any)
Time Management		<a href="https://abb.myhbp.org/hmm12/courses.html">https://abb.myhbp.org/hmm12/courses.html</a>
Planning and Prioritizing		Search for Time Management Project Management

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## 5.2 Engineering Change Management

Competency	Learning Area	Applicability
Engineering Risks and Opportunities	Engineering Change Management	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to understand the terms - "Scope creep", "Peer Review", and "Design freeze".
- I will be able to propose solutions with proper analyses of cost and other associated impacts to the Project Manager (PM) and execute engineering changes after Project Manager's approval

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### What are the Learning Area Objectives?

To understand:

- The procedure to achieve "Design Freeze" with Customers
- The procedure that is followed for implementing and tracking "Engineering Changes" after Design Freeze.
- The importance of "Peer Review Checking" of design documentation before submitting to customer

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### What are the suggestions/examples to apply this learning on-the-job?

- Thoroughly review customer specifications with our offer.
- Actively participate during Project Peer Reviews and Design Freeze meetings.
- Actively implement the procedure for Engineering Change Management.

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The objective of “Change Handling during Project Engineering” is to:

- Keep the cost under control to meet the budget.
- Show the progress and identify any deviation at the earliest.
- Take corrective actions.
- Capture, manage, trace, and facilitate change of scope and solutions.
- Allow for claims with adequate compensation.

#### Key Activities

- Update Engineering Schedule.
- Review costs on an on-going basis.
- Participate actively in project team to communicate progress and highlight any obstacle arising during project execution.
- Proactively raise issues that need to be addressed.
- Proactively resolve issues raised by project management, production, supply management, and other functions as requires.
- Take preventive actions to avoid / mitigate risks and look for changes and claims.
- Receive change request from customer. Review change for impact in:
  - cost
  - price
  - effort
  - schedule
- Implement Engineering Changes on approval by Project Manager (PM).

#### Outputs

- Incorporated approved Changes by Customer and Project Manager (PM) in the deliverable documentation.
- Clearly indicating revision numbers with descriptions to know what changes done during engineering cycle
- Updated Project Schedule and Engineering Hours
- Updated Bill of Materials in SAP

**Note:** The respective local PMO (Project Management Office) and Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – “My Learning”

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### 5.3 Engineering Risks and Opportunities

Competency	Learning Area	Applicability
Engineering Risks and Opportunities	Engineering Risks and Opportunities	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to
  - assess risks to identify consequences with accuracy and by using knowledge of risk management,
  - propose solutions with proper analyses of impact and execute means to mitigate risks.
  - capture opportunities and act on them.

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#### What are the Learning Area Objectives?

To understand:

- How to assess risks to identify consequences by using knowledge of risk management.
- How to propose solutions with proper analyses of associated impact and execute to mitigate risks.
- How to capture opportunities and act on them.
- Guidelines, Tools, and methods to analyze risks and opportunities.

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#### What are the suggestions/examples to apply this learning on-the-job?

- Compile a list of situations including photos from shopfloor/site to demonstrate major quality, safety and/or Cyber Security related design issues, and share with engineering team.
- Identify the top five (5) risks repeated from the last 3 projects related to project scope; develop a Risk Mitigation Plan for future avoidance in similar projects.
- Understand and apply "Project Lead Engineer Complexity Calculator".
- Study the contract, identify top five (5) risks, and propose mitigation actions to Project Manager and project team.
- Study the contract, identify top three (3) opportunities, and propose possible actions to materialize these opportunities to Project Manager and project team.
- Proactively take actions to mitigate risks and enhance opportunities.
- Involves key-decision holders before taking a significant risk.
- Take responsibility for the risks that have been taken.

**Note:** The respective local PMO (Project Management Office) and Engineering Manager to arrange suitable learning opportunities / workshops if there is no equivalent course available in LMS – "My Learning"

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ID	Project Technical Complexity Profile Item
	<b>Technical Complexity</b>
1	What is the Project Scope of Supply
2	The degree to what the products, by design, use new technologies or materials that are novel or unproven in service.
3	The degree to what the integration of the products into plants or systems, even previously proven products, brings complexity in combination
4	The degree of systems engineering required to ensure ABB's products function together holistically, and the robustness and maturity of the Customer's systems, into which our systems and products will be integrated
5	The required need to understand the Customer's technology or special requirements like: 1. Standards & Operating Practices 2. Implementation of Turnkey (or implied requirements) to meet Contractual Scope / Obligations
6	Requirements for Type Tests and/or Validation of Special Standards
7	The degree to what Customer or 3rd party consultants are involved in deciding the technical requirements
8	The required level of sub-suppliers (contractors, consultants, outsourced engineering firms, etc.) involvement to provide services for critical work packages, such as system studies, civil, mechanical, automation, etc.
9	Assessment of Functional-Safety and/or Cyber-Security Requirements
	<b>Geographical &amp; Manpower/Resources Complexity</b>
10	Number of Engineering Disciplines involved
11	Cultural Complexity if many countries are participating
12	Design related to HV / MV Cable-laying or Off-shore Work
13	Design related to Civil / Site Construction Work
14	Involvement of multiple ABB Units
15	Number of Engineering Resources required during peak
	<b>Customer and Project Complexity</b>
16	Customer
17	Order Value in MUSD
18	Hot Commissioning / Off-Shore Commissioning
19	Assessment of Project Schedule to meet technical requirements
20	Functional system test (PreFAT, FAT, FST)
21	Special Customer required CAD systems or Document Control processes

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## 6 Soft skills/ Leadership skills

### 6.1 Technical Information Sharing

Competency	Learning Area	Applicability
Technical Information Sharing	Technical Information Sharing	Associate Designer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to ensure clear, efficient, and timely exchange of information to ensure good results.

**What are the Learning Area Objectives?**

To understand:

- How ensure clear, concise, and timely exchange of information with relevant stakeholders.
- How to build and maintain constructive networks and convince stakeholders to take desirable action by using relevant arguments.

**What are the suggestions/examples to apply this learning on-the-job?**

- Create a clear, concise email.
- Apply assertive communication techniques.

### Off-the-job development opportunities for Learning Area - Technical Information Sharing

Learning Area Topic	Course Code	Link (if any)
Assertive Communication	9CSC015560-GLB-EN-V1	<a href="https://mylearning.abb.com/coursepage/32258_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/32258_enUS/ExpertusONE_1</a>
Customer Focus: Business Writing – How to write clearly and concisely	9CSC000495-GLB-EN	<a href="https://mylearning.abb.com/coursepage/16630_enUS/ExpertusONE_1">https://mylearning.abb.com/coursepage/16630_enUS/ExpertusONE_1</a>

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## 6.2 Influencing without authority

Competency	Learning Area	Applicability
Technical Information Sharing	Influencing without Authority	Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to build and maintain constructive networks and convince stakeholders to take desirable action by using relevant arguments.

### What are the Learning Area Objectives?

Influencing without authority is the ability to deliberately guide an audience to adopt an idea, attitude, or course of action. Individuals should:

- build consensus with stakeholders to achieve desired outcomes on matters of strategic importance
- build and maintain trusted relationships and constructive networks
- adapts their style to different audiences

### What are the suggestions/examples to apply this learning on-the-job?

- Perform stakeholder analysis; learn about Customer; document their priorities & expectations.
- Learn about Customer organization & decision-making process, document sphere of influence for individuals on organization chart.
- Apply the influencing skills learning as part of Design Freeze meetings with relevant Stakeholders.  
e.g.,
  - Establish a rapport with others.
  - Address the need of stakeholders – “What’s there for me?”
  - Use examples, stories, data and/or illustrative language to make a point persuasively.
  - Promote two-way communication with an exchange of information, opinions, and feelings.
  - Actively listen to the input of others and summarize information to ensure it is understood.
  - Anticipate objections to an argument or idea, and effectively deal with these.

### Off-the-job development opportunities for Learning Area - Influencing without Authority

Learning Area Topic	Course Code	Link (if any)
Customer Focus		<a href="https://abb.myhbp.org/hmm12/courses.html">https://abb.myhbp.org/hmm12/courses.html</a> Search for Customer Focus Presentation Skills Meeting Management Persuading Others Negotiating
Presentation skills		
Meeting Management		
Persuading Others		
Negotiation skills		



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### 6.3 Coaching

Competency	Learning Area	Applicability
Technical Information Sharing Consulting and Facilitating	Coaching	Senior Project Engineer and above

**What's is the motivations for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to apply coaching process and skills to achieve good results.

#### What are the Learning Area Objectives?

Coaching involves acting as a partner to grow and develop. individuals should:

- lead by example at organizational level
- inspire, motivate, and guide others to adopt a point of view, make changes or act
- cultivate an open, cooperative, and collaborative learning culture for the organization
- identify strength and development areas in others and provide constructive feedback

#### What are the suggestions/examples to apply this learning on-the-job?

- Recognize the key strengths and development needs of individuals working in the team.
- Provide constructive feedback and advice on the individual's performance.
- Identify development needs for each of the team members.
- Encourage team members to take up the development opportunities and maximize their potential.
- Demonstrate a desire to help others reach their potential.
- Apply coaching process learning to establish partnering relationships and build mutual commitment.
- Apply coaching process and skills to coach young professionals in the team.

#### Off-the-job development opportunities for Learning Area - Coaching

Learning Area Topic	Course Code	Link (if any)
Coaching		<a href="https://abb.myhbp.org/hmm12/courses.html">https://abb.myhbp.org/hmm12/courses.html</a> Search for Coaching

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## 6.4 Facilitating and Problem Solving

Competency	Learning Area	Applicability
Consulting and Facilitating	Facilitating and Problem Solving	Senior Project Engineer and above

**What is the motivations for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to establish partnering relationships and builds mutual commitment to solve the business problems.

### What are the Learning Area Objectives?

To understand:

- How to establish partnering relationships and builds mutual commitment.
- How to apply Facilitating / Problem Solving and Design Thinking process to achieve good results.
- How to enrich the operation of other organizations using our teams' expertise.

### What are the suggestions/examples to apply this learning on-the-job?

- Create Personas to understand stakeholders' pain areas, needs and expectations.
- Apply the learning to facilitate a Design Thinking / Problem solving workshop.
  - Bring together individuals with complementary skills, knowledge, and experience.
  - Promote a sense of collective ownership to solve the problem or the needs of the customer.
  - Distinguish what is a need and a want; and focus the team attention on needs and expectations.
  - Identify the cause or causes of a problem along with the team/stakeholders.
  - Explore a range of possible solutions along with the team/stakeholders.
  - Propose / develop practical solutions to address the identified needs and expectations/ problems along with team/stakeholders.

### Off-the-job development opportunities for Learning Area - Facilitating and Problem Solving

Learning Area Topic	Course Code	Link (if any)
Design Thinking Define-Empathize-Ideate-Prototype		<a href="https://abbtv.inside.abb.com/2017/11/21/design-thinking-define">https://abbtv.inside.abb.com/2017/11/21/design-thinking-define</a> <a href="https://abbtv.inside.abb.com/2017/11/21/design-thinking-empathize">https://abbtv.inside.abb.com/2017/11/21/design-thinking-empathize</a> <a href="https://abbtv.inside.abb.com/2017/11/21/design-thinking-ideate">https://abbtv.inside.abb.com/2017/11/21/design-thinking-ideate</a> <a href="https://abbtv.inside.abb.com/2017/11/21/design-thinking-prototype">https://abbtv.inside.abb.com/2017/11/21/design-thinking-prototype</a>
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## 6.5 Consulting

Competency	Learning Area	Applicability
Consulting and Facilitating	Consulting	Senior Project Engineer and above

**What is the motivation for me to learn this Competency?** (e.g., Advantages when it is improved with examples or experience related to the competency)

- I will be able to apply consulting process to achieve good results.

### What are the Learning Area Objectives?

Consulting involves acting as a partner to grow and develop individuals or organizations. individuals should:

- lead by example at organizational level
- inspire, motivate, and guide others to adopt a point of view, make changes or act
- cultivate an open, cooperative, and collaborative learning culture for the organization
- identify strength and development areas in others and provide constructive feedback

### What are the suggestions/examples to apply this learning on-the-job?

- Learn about Customer organization & decision-making process, document sphere of influence for individuals on organization chart.
- Create "Personas" to understand stakeholders' pain areas, needs and expectations.
- Apply consulting process learning to establish partnering relationships and build mutual commitment.
- Facilitate a Design Thinking / Problem solving workshop.

## Off-the-job development opportunities for Learning Area - Consulting

Learning Area Topic	Course Code	Link (if any)
Customer Focus		<a href="https://abb.myhbp.org/hmm12/courses.html">https://abb.myhbp.org/hmm12/courses.html</a>
Coaching		Search for Customer Focus
Negotiation skills		Coaching
Persuading Others		Negotiating Persuading Others