

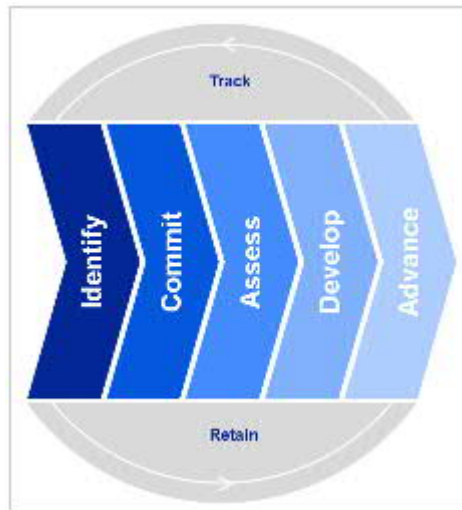
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Prepared: Saikrishna Kanuparthi	Checked: ELDS Engineering Council	Approved: Lorenzo Bonzi	Replaced	Valid for: ELDS	

ABB internal

Distribution Solutions (ELDS)

Engineering Strategic Initiative

ELDS Project Engineering Learning Catalogue



March 2022
Rev C

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1 Motivation for Engineering Learning Catalogue

The core technologies of Distribution Solutions include:

- Switching and Current Interruption
- Control of Power
- ABB Ability™ - Distribution Solutions

The project engineering team in Distribution Solutions provides the solutions/application expertise of above technologies to meet our customer's business needs and challenges related to distribution of power/energy:

- Air Insulated Medium Voltage (MV) and Low Voltage (LV) Switchgear and Motor Control Centers
- Gas Insulated Medium Voltage Switchgear
- Integration with Indoor and outdoor components for switching and measurement, soft starters, Variable Frequency Drives (VFDs), Un-interrupted Power Supply (UPS) and Intelligent Automation Devices
- Packaging and Solutions
- Digital Solutions incl, Integration and communication with Plant Control Systems

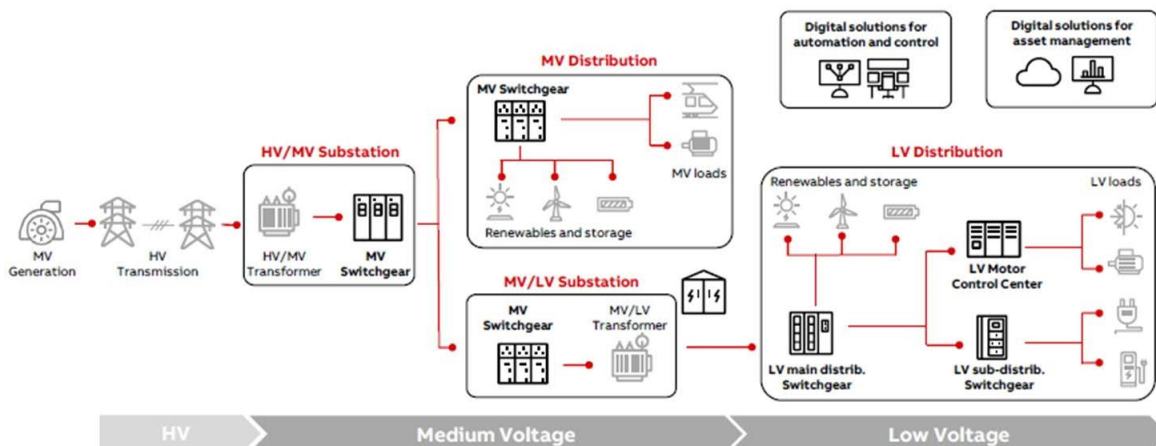


Figure 1– Safe, Smart and Sustainable Energy Distribution Solutions

The project application engineering of above areas can be broadly divided into:

- Switchgear Engineering (Configuration of main circuit and mechanics)
- Engineering of Auxiliary circuit, protection, control/automation, IEDs, VFDs, Communication

Engineering is a critical activity in our execution process and has a huge impact on achieving on-time-delivery (ROTD), and optimizing product costs. The need for highly skilled engineers in their own job role is obvious and essential to bring our overall performance to a higher level.

Another aspect to consider is how to retain our engineers! In a lot of countries, the labor market for engineers is tight and the attractiveness of the engineering function isn't perceived as high. Clarity about a possible career path gives our engineers an outlook and a motivation the develop themselves and to grow.

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2 ABB Learning Philosophy

Competency is a set of behaviors, skills and knowledge that will enable an engineer to be successful in their job. Competencies can be developed either through training, coaching, mentoring, feedback, or through On-the-Job learning.

This section describes the Engineering Competencies and possibilities to acquire these competencies by applying ABB Learning Philosophy

2.1 Functional Competencies for Engineering

The engineering competency model will ensure a uniform understanding of the competency requirements for each engineering job across ABB. The Functional Competency Assessment (FCA) provides engineers an opportunity to evaluate their own competence against required engineering competence levels, identify and discuss development needs and career potential at ABB. Employee commitment to and ownership of continuous development, will result in superior performance of individuals and the organization.

On the engineering competency portal, we have a comprehensive toolbox to assess competencies, create individual development plans and ensure follow-up of development actions.

Competency	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 Risk 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 and Prioritizing	Creates and adjusts plans in line with strategic goals and priorities coordinating with interrelated functions to increase efficiency.
Consulting and 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.

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2.2 Developing Engineering 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 Competence Development for engineers.

ABB's Learning philosophy follows 70:20:10 principle for developing competencies.

Learning category	Typical activities with examples
On-the-job (70%)	<p>Experiential learning (learn from work experience) Business related reflection</p> <p>Examples:</p> <ul style="list-style-type: none"> • 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. • Identify the top risks repeated from the last 3 projects related to project scope. • Complete Design Verification according to IEC/ANSI Standards. • Participate in a Design Verification according to IEC/ANSI standards as part of Project Peer Review • Actively utilize Engineering Configurator, EPLAN Electric P8 / SolidWorks or other applicable tools for Switchgear configuration, electrical / mechanical design. • Validate the BOM before uploading to SAP. • Study a report related to "Power Systems Studies", and understand how it impacts the design of Electrical Distribution System e.g., Relay Settings • Volunteer to participate in "Power Systems Studies".
Along-the-job (20%)	<p>Self-reflection Coaching, mentoring</p> <p>Examples:</p> <ul style="list-style-type: none"> • Develop 3 actions for personal learning from lessons learned on past 3 projects. • Identify the areas where you need coaching or mentoring along with your Line Manager.
Off-the-job (10%)	<p>Formal training Self-study Reading</p> <p>ELDS Project Engineering Learning Catalogue has off-the-job development opportunities.</p>

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3 ABB Learning Management System (LMS)

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).

3.1 MyLearning – Key features and benefits



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

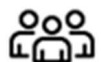


Offline access and learning synchronization: e-learning courses on the go, allowing continued learning across different devices from wherever you had paused



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

3.2 Logging In, Overview

To get started, please

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

4 Distribution Solutions Engineering Learning Areas

In total 21 learning/assessment areas are defined (see table below) which reflect the competence areas of our primary business in Distribution Solutions. The equivalent learning areas are documented in ELDS Engineering Learning Catalogue

- Associate Designers, Associate Project Engineers, Designers and Senior Designers needs to be trained on areas 1 to 7 (rest of the areas is optional),
- Principal Designers and Project Engineers needs to be trained on areas 1 to 14 (rest of the areas is optional) and
- Senior Project Engineers, Principal Project Engineers, Project Lead Engineers and Senior Project Lead Engineers needs to be trained on areas 1 to 21.

ELDS Learning portals:

<https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-and-sales/Distribution-Solutions-Training>

#	Learning Area	Engineering Competency	Associate Designers Designers Sr. Designers Associate Project Engineers	Principal Designers Project Engineers	Sr. Project Engineers Principal Project Engineers Project Lead Engineers Sr. Project Lead Engineers
1	Distribution Solutions Overview	Engineering Technical Expertise	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Electrical/mechanical components, design, and functions	Engineering Technical Expertise	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	Switchgear Functional Engineering / Design	Engineering Solutions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	Data Driven Engineering I	Engineering Processes and Tools	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	Engineering Change Management	Engineering Risk and Opportunities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	Technical Information Sharing	Technical Information Sharing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Planning and Prioritizing	Planning and Prioritizing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

#	Learning Area	Engineering Competency	Associate Designers Designers Sr. Designers Associate Project Engineers	Principal Designers Project Engineers	Sr. Project Engineers Principal Project Engineers Project Lead Engineers Sr. Project Lead Engineers
9	Packaging and Solutions I	Engineering Technical Expertise Engineering Solutions		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	Digital Switchgear	Engineering Technical Expertise Engineering Solutions		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	Design Thinking	Engineering Solutions		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	Design Verification	Engineering Technical Expertise Engineering Solutions		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	Data Driven Engineering II	Engineering Processes and Tools		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	Engineering Risks and Opportunities	Engineering Risk and Opportunities		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	Influencing Skills for Project Engineers	Technical Information Sharing		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	Packaging and Solutions II	Engineering Technical Expertise Engineering Solutions			<input checked="" type="checkbox"/>
16	Digital Solutions Design and Implementation for Digital Solution Centers (DSCs)	Engineering Technical Expertise Engineering Solutions			<input checked="" type="checkbox"/>
17	Basic Power Systems Studies for Electrical Engineers	Engineering Technical Expertise Engineering Solutions			<input checked="" type="checkbox"/>
18	Design for Excellence	Engineering Solutions		Optional	<input checked="" type="checkbox"/>
19	Switchgear Applications	Engineering Solutions			<input checked="" type="checkbox"/>
20	Facilitating Skills	Consulting & Facilitating			<input checked="" type="checkbox"/>
21	Consulting Skills	Consulting & Facilitating			<input checked="" type="checkbox"/>

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5 Learning Catalogue for development

5.1 Distribution Solutions Overview

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

<p>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)</p> <ul style="list-style-type: none"> I will be able to apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions I will be able to keep my expertise up to date.
<p>What are the Learning Area Objectives?</p> <p>To understand Distributions Solutions business.</p>
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <p>Study your Customer's Contract, and discuss with Project Manager and team:</p> <ul style="list-style-type: none"> What Standards and Statutory requirements are applicable for designing Switchgears to meet the contractual obligations? How do we meet the project scope statement? How will we apply our judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions?
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
S1537E – Introduction to Distribution Solutions	9CSC006119-GLB-EN		https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions
Distribution Solutions Training portal			https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/functions/marketing-and-sales/Distribution-Solutions-Training

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

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5.2 Electrical/mechanical components, design, and functions

Competency	Learning Area	Applicability
Engineering Technical Expertise	Electrical/mechanical components, design, and functions	Associate Designer and above

<p>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)</p> <ul style="list-style-type: none"> I will be able to apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions I will be able to keep my expertise up to date.
<p>What are the Learning Area Objectives?</p> <p>To understand "Electrical/mechanical components selection & application, design and functions" related to Switchgear</p>
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <p>Study your Customer's Contract, and discuss with Project Manager and team:</p> <ul style="list-style-type: none"> What Standards and Statutory requirements are applicable for designing Switchgears to meet the contractual obligations? How do we meet the project scope statement? How will we apply our judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions?
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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Off-the-job development opportunities for Learning Area - Electrical/mechanical components, design, and functions

Low Voltage Switchgear

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
About MNS and electrification solutions			http://new.abb.com/low-voltage/products/switchgear
Low-voltage switchgear and controlgear			IEC 60947
Low-voltage switchgear and controlgear assemblies			IEC 61439
Power loss / Temperature Rise			IEC 60890
Arc Fault Containment			IEC 61641
Degrees of Protection (IP)			IEC 60529
Forms of Segregation			
Low voltage products and systems			https://new.abb.com/low-voltage/
Soft starters			Soft starter Handbook
ABB SOC Coordination Tables			https://www.lowvoltage-tools.abb.com/soc/
Low voltage products and systems - Smart Power Training Portal			https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/smart-power/training

Medium Voltage Switchgear Overview

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Medium Voltage Products			https://new.abb.com/medium-voltage
Switchgear webinar series			https://new.abb.com/medium-voltage/service/training (please look at webinars)
			IEC62271-1
Air insulated switchgear - Medium Voltage			https://new.abb.com/medium-voltage/switchgear/air-insulated
Medium voltage motor control center			https://new.abb.com/medium-voltage/switchgear/motor-control-centers
Gas insulated switchgear - Medium voltage			https://new.abb.com/medium-voltage/switchgear/gas-insulated-switchgear
Railway Switchgear and DC traction power supply			https://new.abb.com/medium-voltage/switchgear/railway-switchgear https://new.abb.com/medium-voltage/switchgear/railway-switchgear/dc-traction-power-supply

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eLearning Courses (MyLearning Portal)

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
IEC 61439, IEC6164-TR	9CSC010766-GLB-EN		
Understanding IEC 61439 & IEC 60947 Guidelines	9CSC013852-GLB-EN		
S1533E - LV Systems – Basic Course	9CSC006041-GLB-EN		
S1538E – LV Systems – Intermediate Course	9CSC006675-GLB-EN		
S1585E -ABB LV Systems Switchgear Portfolio & Sales Skills	9CSC014036-GLB-EN		
IEC 62271-1	S785e		
S1551E – UniGear Family	9CSC015818-GLB-EN		
S1552E – UniSec	9CSC009665-GLB-EN		
GIS - ABB'S ZX Family	9CSC006636		
S1574E - PrimeGear ZX0	9CSC014802-GLB-EN		
S1557E – Distribution Solution Railway Segment Introduction	9CSC010163-GLB-EN-V1		

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

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5.3 Switchgear Functional Engineering / Design

Competency	Learning Area	Applicability
Engineering Solutions	Switchgear Functional Engineering / Design	Associate Designer 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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions
- keep my expertise up to date.
- understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer

What are the Learning Area Objectives?

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

- Technical specifications and limitations.
- Safety Aspects in switchgear design
- Switchgear Engineering Guidelines
- Module types and Applications
- Integrated ABB Devices
- Switchgear design for DC applications.
- Earth fault and Neutral connections' systems
- Power Factor Correction
- Arc proof solution
- Bus ducts

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

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

- What are the functional requirements for designing Switchgears to meet the contractual obligations?

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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Project Engineering Fundamentals

All successful projects have some elements in common, independent of the market, customer, location, size, value, or complexity. Being "best-in-class", these fundamentals allow we deliver more value to our customers and improve our own overall profitability. These fundamentals can be divided into:

- Key Fundamentals and
- Design Fundamentals.

Key fundamentals are important for successful execution of projects.

1. Engineering Start-up and planning
2. Design Freeze
3. Cost Control
4. Use of Proven and Standard Solutions
5. Change Order Handling During Project Execution


The design fundamentals Speeds up projects, increases quality, margins, revenues, and cash-flow and customer satisfaction

1. Standard and New Design
2. Design Review and Verification
3. Test and Validation
4. System Production and Delivery
5. Project/Process Review

Fundamental	Objective(s)
Engineering Start-up and planning	<ul style="list-style-type: none"> • Clarify the scope internally and externally. • Ensure predictable engineering tasks to meet quality, cost, and schedule targets.
Design Freeze	<ul style="list-style-type: none"> • Emphasize that the switchgear design is finished, and a new approach against changes will start
Cost Control	<ul style="list-style-type: none"> • Keep the cost under control to meet the budget. • Show the progress and identify any deviation at the earliest. • Take corrective actions.
Use of Proven and Standard Solutions	<ul style="list-style-type: none"> • Reuse Proven and Standard solutions and best practices to the benefit of Customer and ABB. • Transfer the proven and verified as per IEC/ANSI/UL standards to the local/hub engineering unit master database.

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Fundamental	Objective(s)
Change Order Handling	<ul style="list-style-type: none"> Capture, manage, trace, and facilitate change of scope and solutions. Perform changes only after seeking Project Manager’s approval. Allow for claims with adequate compensation.
Standard and New Design	<ul style="list-style-type: none"> Select the most suitable solution with consideration of scope, adaptability, performance, and cost without compromising “Fail-safe philosophy” and “Secure-by-design principles” as part of Engineering Solution to meet Contractual Obligations. Ensure that all details for the object are specified and in accordance with functional, contractual, and quality requirements, and 2NAA000043 (DTO). Ensure that the test and validation will be performed in accordance with our contractual and quality requirements.
Design Review and Verification	<ul style="list-style-type: none"> Ensure that all contractual obligations are fulfilled, and the Design Criteria met as per IEC/ANSI/UL standards. Enable the “Design Freeze” as early as possible during the execution of the project. Submit the contract that includes deadline of review time to customer to alert them to keeping deadline of review time. Otherwise, delivery date of the whole project must be re-negotiated with customer. Design freeze is finally finished by customer's confirmation after review of submitted drawings and documents from engineering team. However, the period of review time of customer is generally much longer than the period of a contract. based on project schedule. Thus, we need to alert customer to keeping deadline of review time.
Test and Validation	<ul style="list-style-type: none"> Assure that the tests are conducted according to the Test Specification. Validate that the test performance is in accordance with all contractual obligations.
System Production and Delivery	<ul style="list-style-type: none"> Produce and deliver the scope consisting of Hardware, Software and Documentation according to contractual obligations.
Project/ Process Review	<ul style="list-style-type: none"> Assess the process performance during execution of the project. Improve and optimize the process continuously.

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
ABB Switchgear Manual			
Engineering Guidelines			
SOC - Selected Optimized Coordination	9CSC018313-GLB-EN		
Motor Starting and Protection			https://new.abb.com/low-voltage/products/motor-protection/motor-starting-and-protection/
IEC Arc Flash Protection and Mitigation Solutions	9CSC014431-GLB-EN		
ANSI/UL Arc Flash Protection and Mitigation Solutions	9CSC014901-GLB-EN		
Appreciation of Functional Safety and Cyber-Security during the Solution Design and Implementation			IEC 62443 IEC 61511
Reference Designation of objects for electrical documents			IEC 61082-1 IEC 81346 -1 & IEC 81346-2
DTO (Design to Order) control policy			2NAA000043

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

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5.4 Data Driven Engineering I

Competency	Learning Area	Applicability
Engineering Processes and Tools	Data Driven Engineering - I	Associate Designer and above

<p>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)</p> <ul style="list-style-type: none"> 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.
<p>What are the Learning Area Objectives?</p> <p>To understand the process and tools:</p> <ul style="list-style-type: none"> ELDS Engineering Deliverables Overview ELDS Engineering Data Flow Reference Designation of objects for electrical documents Rules for electrical documents – Switchgear Load List Utility Configurators e.g. Rulestream, Treffo, MNS Engineer, SmarTool.. MVE EPLAN Electric P8 SolidWorks Autocad (Autodesk) ProPanel SAP
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> Actively utilize Engineering Configurator, EPLAN P8 / Solidworks / Autocad or other applicable tools for Switchgear configuration, electrical / mechanical design. Validate the BOM before uploading to SAP.
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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Basic Engineering/Design	Detailed Engineering/Design	Production, Testing and Closure
Objective		
<p>The objective of this step is to complete the basic engineering as per contractual obligations, and seek the design approval from the customer. The design freeze emphasizes that the switchgear design is finished, and a new approach against changes will start.</p> <p>This step can also include incorporation of EDR / ECR and DTO Control Policy (2NAA000043) / prototyping/ order specific R&D before we start detailed design and system production. This is very important to validate & verify the design part of electrical/ mechanical & automation.</p>	<p>The objective of this step is to ensure that all contractual obligations are fulfilled, and the Design Criteria is met as per IEC/ANSI standards, and Statutory requirement like Country/ National/ State Electricity Rules/ Acts.</p> <p>Project Manager/Engineer releases the Bill of Materials (BOM) / Parts List to SCM and Production to meet the contractual obligations, and ensures no Project Left Over Material (PLOM) as part of this step.</p>	<p>The objective of this step is to Issue Production Master and necessary test plans to produce and test the scope consisting of Hardware, Software and Documentation according to contractual obligations. Post inspection the as-built documentation is updated by the Project Engineer.</p>
Key Activities		
<p>Understand key contractual obligations, project scope and requirements.</p> <p>Perform Basic Design</p> <p>Perform 'Design Freeze'</p> <ul style="list-style-type: none"> Documentation for approval Customer comments Comments implementation 	<p>Perform design for Non-standard solutions</p> <ul style="list-style-type: none"> Mechanical BOM 3D model Design Verification <p>Finalize Bill of Materials (BOM)</p> <p>Finalize of production master folder as a hard/soft copy based on local procedures.</p>	<p>Produce supporting production documents</p> <ul style="list-style-type: none"> Connection tables Nameplate specifications Drilling patterns <p>Update "As Manufactured/Built" Documentation.</p>
Outputs		
<p>Approved Basic Drawings Package</p> <p>Design Freeze</p> <p>Electrical BOM</p>	<p>Production Master Folder</p> <p>Complete Structured Bill of Materials (BOM)</p> <p>Application Software for the projects e.g IEDs, SCADA/PLC programming (if applicable)</p>	<p>Production Master Folder</p> <p>As-Manufactured/ As-Built Documentation</p>

Key Project Engineering Process Steps

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ELDS IT Landscape

Focus Area	ANSI MV/LV Switchgear (Target)	IEC LV Switchgear	IEC MV Switchgear
Sales Configurator	Empower / RULESTREAM Ecosystem	Treffo Configurator (MNSPro)	Treffo Configurators
Engineering Configurator	Empower / RULESTREAM Ecosystem	MNS Engineer	
MVE	Not applicable	MVE (only for Automatic Document Generation)	MVE
Electrical CAD	EPLAN Electric P8	EPLAN Electric P8	EPLAN Electric P8
Mechanical CAD	CREO/SolidWorks	SolidWorks EPLAN ProPanel (only for selected factories)	SolidWorks EPLAN ProPanel (only for selected factories)
PLM	PTC Windchill	PTC Windchill for execution expected in 2024	PTC Windchill for execution expected in 2023
SAP	SAP Torque	SAP modules differ between countries	SAP modules differ between countries.

Off-the-job development opportunities for Learning Area - Data Driven Engineering I

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
ELDS Engineering Deliverables Overview			
ELDS Engineering Data Flow			
Reference Designation of objects for electrical documents Rules for electrical documents – Switchgear			2NBA000001 Reference Designation of objects for electrical documents 2NDA000001 Rules for documents of electrical engineering in Eplan projects 3WYR000001_Tabs List of required data for component data tabs according to ABB class
DTO (Design to Order)			2NAA000043 DTO control policy


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

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5.5 Engineering Change Management

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

<p>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)</p> <ul style="list-style-type: none"> • 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/organization and execute engineering changes.
<p>What are the Learning Area Objectives?</p> <p>To understand:</p> <ul style="list-style-type: none"> • 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
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> • Actively participate during Project Peer Reviews. • Actively implement the procedure for Engineering Change Management.
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> • Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) • Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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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.
- Raise issues that need to be addressed.
- 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
 - time schedule
- Implement Engineering Changes on approval by Project Manager (PM).

Outputs

- Incorporated approved Changes by Customer and Project Manager (PM) in the deliverable documentation.
- Updated Project Schedule and Engineering Hours
- Updated Bill of Materials in SAP

Off-the-job development opportunities for Learning Area - Engineering Change Management

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Scope and Change Management in Projects			
Project Peer Reviews			

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

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5.6 Technical Information Sharing

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

- ensure clear, efficient, and timely exchange of information to ensure good results.
- achieve efficient transfer of know-how by sharing their knowledge with colleagues/stakeholders.
- build and maintain constructive networks and convince stakeholders to take desirable action by using relevant arguments.

What are the Learning Area Objectives?

To understand:

- How ensure clear, concise, and timely exchange of information to ensure good results
- How to achieve efficient transfer of know-how by sharing their knowledge with colleagues/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?

- Perform Stakeholder analysis; learn about Customer; document their priorities & expectations.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Assertive Communication	9CSC015560-GLB-EN-V1		
Customer Focus: Business Writing – How to write clearly and concisely	9CSC000495-GLB-EN		

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

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5.7 Planning and Prioritizing

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

- ensure clear, efficient, and timely completion of deliverables to ensure good results.
- Create, and adjust plans in line with strategic goals and priorities coordinating with interrelated functions to increase efficiency.

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.
- How to create and adjust plans in line with strategic goals and priorities coordinating with interrelated functions to increase efficiency.

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

- Perform Stakeholder analysis
- Learn about Customer; document their priorities & expectations with clear agreed timelines.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc.)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Time Management			Time Management Harvard ManageMentor (myhbp.org)
Planning and Prioritizing			https://abb.myhbp.org/hmm12/content/project_management/landingpage.html

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

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5.8 Packaging and Solutions I

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Packaging and Solutions I	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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions
- understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer

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?

- Understand and apply preconfigured, standardized, scalable and replicable solutions.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Packaging and Solutions Overview	S1556e 9CSC010165-GLB-EN-V1		https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions https://new.abb.com/medium-voltage/packaging-and-solutions
Compact Secondary Substations (CSS)	S818e		https://new.abb.com/medium-voltage/modular-systems/compact-secondary-substations
IEC Standards for CSS	S837e; S838e S839e		

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

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5.9 Digital Switchgear

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Digital Switchgear	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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions.
- apply my knowledge, judgement & expertise to understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer.

What are the Learning Area Objectives?

To understand Digital Switchgear design:

- Application and integration of intelligent motor controllers (M10x, UMC)
- Application and integration of intelligent protection devices (Relion® / ABB IEDs)
- Application of communication networks (MODBUS, PROFIBUS / PROFINET)
- IEC 61850
- Application in transfer switches

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

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

- What are the functional requirements for designing Digital Switchgears to meet the contractual obligations?
- How do I apply my learning of IED (Intelligent Electronic Devices) programming?
- Configure and Test Protection & Control applications e.g. Motor or Feeder protection application with IEDs or Digital Switchgear.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Smart Power Digital Solutions			https://new.abb.com/low-voltage/products/smart-power-digital-solutions https://new.abb.com/low-voltage/solutions/smart-switchgear/
Low Voltage Switchgear Digital	9CSC006717-GLB-EN		https://new.abb.com/low-voltage/launches/low-voltage-switchgear-digital
UniGear Digital	S833e		https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/unigear-digital
UniSec Digital			https://new.abb.com/medium-voltage/switchgear/air-insulated/iec-and-other-standards/iec-air-insulated-secondary-switchgear-unisec-digital
ZX Digital			
VD4 Digital Upgrade			https://new.abb.com/medium-voltage/service/extension-upgrades-and-retrofits/vd4-digitup
Motor Starting and Protection			https://new.abb.com/low-voltage/products/motor-protection/motor-starting-and-protection/
Distribution Automation Overview			https://new.abb.com/medium-voltage/digital-substations https://new.abb.com/medium-voltage/distribution-automation/misc/distribution-automation-handbook
Distribution Automation Webinar Series			https://new.abb.com/medium-voltage/service/training/recorded-webinars/distribution-automation-webinar-series
Basics of Distribution Networks			
Monitor and Command systems with ABB Circuit Breakers	9CSC001978-GLB-EN		
P224E IEC 61850 and Ethernet Redundancy	P224e-GLB-EN		
MODBUS			
PROFIBUS			
M10x			MNS with M10x - Low voltage switchgear (A-Z Low Voltage Products navigation) ABB
Universal Motor Control (UMC)	F1197w		Universal Motor Controllers - A-Z Low Voltage Products navigation ABB
Relion® (ABB IEDs)	P211e (630) P220e (615) P221e (611) P263 (630) P264 (630) REX640		Relion - Protection and control products for power distribution ABB Numerical relays - Protection and control products for power distribution ABB Relay retrofit solutions - Digital solutions (Protection and control products for power distribution) ABB Retrofits - Extensions, upgrades and retrofits (Service and legacy product support) ABB
PCM600	PCM600		Engineering tools - Protection and control products for power distribution ABB

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

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5.10 Design Thinking

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Design Thinking	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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions.
- apply my knowledge, judgement & expertise to understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer.

What are the Learning Area Objectives?

To understand:

- How Design Thinking is applied to solve problems that enhance Customer Experience
- The prime ingredients of design thinking - Empathize, Define the problem, Ideate, Prototype and test.

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

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

- How will we apply Design Thinking to achieve/ implement effective (efficient and high quality) and safe results/solutions?

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


This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc.)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Design Thinking - Double Diamond Model	9CSC017090-GLB-EN		
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 New LMS – "My Learning"

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5.11 Design Verification

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

<p>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)</p> <ul style="list-style-type: none"> I will be able to apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions. I will be able to deliver engineering solutions that meet business needs and add value to customer.
<p>What are the Learning Area Objectives?</p> <p>To understand:</p> <ul style="list-style-type: none"> The methodology utilized for Design verification e.g., Calculation, independent assessment, peer reviews How to perform Design Verification acc. IEC/ANSI Standards
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> Participate in a Design Verification according to IEC/ANSI standards as part Project Peer Review Complete Design Verification according to IEC/ANSI standards or as per Checklists.
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Applicable Global Standards			https://go.insideplus.abb.com/tools-and-services/abb-standards/global-standards
IEC 61439, IEC6164-TR	9CSC010766-GLB-EN		
Understanding IEC 61439 & IEC 60947 Guidelines	9CSC013852-GLB-EN		
IEC 62271-1	S785e		
IEC Standards for Compact Substations (CSS)	S837e; S838e S839e		
Project Peer Reviews			

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

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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 team(s).

Effectiveness of Project Peer Reviews are determined by:

- Number of internal BOM Revisions
- Number of Work Authorizations identified during Manufacturing/ Testing

Design Verification

Design verification may comprise one or more equivalent methods

- verification test
- verification comparison
- verification assessment

Guidance

1. Ensure that all contractual obligations are fulfilled, and the Design Criteria met as per relevant Standards.
2. Design verification shall be performed according to the latest Engineering Guidelines published by Global R&D team.
3. Design verification shall ideally 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 Minutes of Meeting (MOM) to carry out identified actions (if any).

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5.12 Data Driven Engineering II

Competency	Learning Area	Applicability
Engineering Processes and Tools	Data Driven Engineering- II	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 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:

- 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
- Excel skills related VLOOKUP function, Pivot Table ...
- 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?

- 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 your insights.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Data Driven Engineering II

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Digital Intelligence			https://abb.myhbp.org/hmm12/content/digital_intelligence/landing_page.html
Data Analysis utilizing Excel			
Power BI			https://esi.microsoft.com?delid=35902 https://esi.microsoft.com?delid=35949

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

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5.13 Engineering Risks and Opportunities

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

<p>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)</p> <p>I will be able to</p> <ul style="list-style-type: none"> • assess risks to identify consequences with accuracy and by using knowledge of risk management, • propose solutions with proper analyses of associated impact and execute means to mitigate risks. • capture opportunities and act on them.
<p>What are the Learning Area Objectives?</p> <p>To understand:</p> <ul style="list-style-type: none"> • What technical risks do we experience in engineering? • How to capture opportunities? • Guidelines, Tools, and methods to analyze risks and opportunities
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> • Identify the top risk repeated from the last 3 projects related to project scope; develop a Risk Mitigation Plan and include in the Scope Statement for future avoidance in similar projects. • Compile a list of situations including photos from shopfloor/site to demonstrate major quality, safety and/or Cyber Security related design issues and share to the engineering team.
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> • Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) • Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Engineering Risks and Opportunities

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Engineering Risks and Opportunities			

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

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ID	Project Complexity Profile Item
	Technical Complexity
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
	Geographical & Manpower/Resources Complexity
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
	Customer and Project Complexity
16	Customer
17	Order Value in MUS\$
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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5.14 Influencing Skills for Project Engineers

Competency	Learning Area	Applicability
Technical Information Sharing	Influencing Skills for Project Engineers	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

- ensure clear, efficient, and timely exchange of information to ensure good results.
- achieve efficient transfer of know-how by sharing their knowledge with colleagues/stakeholders.
- build and maintain constructive networks and convince stakeholders to take desirable action by using relevant arguments.

What are the Learning Area Objectives?

To understand:

- How ensure clear, concise, and timely exchange of information to ensure good results
- How to achieve efficient transfer of know-how by sharing their knowledge with colleagues/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?

- Perform Stakeholder analysis; learn about Customer; document their priorities & expectations.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Influencing Skills for Project Engineers

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Customer Focus			Customer Focus Harvard ManageMentor (myhbp.org)
Presentation skills			Presentation Skills Harvard ManageMentor (myhbp.org)
Negotiation skills			Negotiating Harvard ManageMentor (myhbp.org)

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

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5.15 Packaging and Solutions II

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Packaging and Solutions II	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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions.
- apply my knowledge, judgement & expertise to understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer.

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?

- Understand and apply preconfigured, standardized, scalable and replicable solutions.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Packaging and Solutions Overview	S1556e		https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions
Skid Solutions	S1573e		https://new.abb.com/medium-voltage/packaging-and-solutions/industrial-unit-substations
eHouses	9CSC015498-GLB-EN		https://new.abb.com/medium-voltage/packaging-and-solutions/electrical-houses
Energy Storage Solutions / Energy Storage Systems	9CSC018362-GLB-EN		https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions/energy-storage-solutions
	9CSC017744-GLB-EN		https://new.abb.com/medium-voltage/packaging-and-solutions/energy-storage-solutions
Data Center Solutions	9CSC016319-GLB-EN		


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

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5.16 Digital Solutions Design and Implementation for Digital Solution Centers (DSCs)

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

<p>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)</p> <p>I will be able to</p> <ul style="list-style-type: none"> • apply my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions. • apply my knowledge, judgement & expertise to understand customer infrastructure and needs. • identify, improve, and deliver engineering solutions that meet business needs and add value to customer. • apply my knowledge of Cybersecurity, Digital Solutions, Internet of Things (IOT) and analytics that provide our customers with shorter lead times, a smoother startup, and less risk.
<p>What are the Learning Area Objectives?</p> <p>To understand:</p> <ul style="list-style-type: none"> • Cybersecurity, Digital Solutions, Internet of Things (IOT) and analytics that provide our customers with shorter lead times, a smoother startup, and less risk.
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> • Understand and apply Cybersecurity, Digital Solutions, Internet of Things (IOT) and analytics during the execution of projects
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> • Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) • Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

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Off-the-job development opportunities for Learning Area - Digital Solutions

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Digital Solutions for Medium Voltage and Low Voltage	9CSC013840-GLB-EN		
Digital Substation Products			https://new.abb.com/medium-voltage/digital-substations
PLC Automation			https://new.abb.com/plc
CP600 control panels platform			CP600 control panels platform ABB
PLC Automation Tools Box			PLC Automation toolbox (abb.com)
SCADA (Zenon)			ABB Ability Operations Data Management zenon
Relion protection and control			Relion - Protection and control products for power distribution ABB Numerical relays - Protection and control products for power distribution ABB
PCM600			Engineering tools - Protection and control products for power distribution ABB
SSC600	9CSC006033-GLB-EN		
COM600S 4.1 Cyber Security	S1507e		
ABB Ability™ solutions: Protecting data with unsurpassed industrial-strength cybersecurity			ABB Ability™ solutions: Protecting data with unsurpassed industrial-strength cybersecurity
White Paper - AC500 Cyber Security			White Paper - AC500 Cyber Security (abb.com)
ISA 62443 Fundamentals; and linking to Functional Safety			IEC 62443 IEC 61511
SDIP151E – Cyber Security – Working with Customer Systems	SDIP151e		
V2148e - Minimum Cyber Security Requirements for Project Deployment	V2148e_1-ALL-EN		
Intelligent Distribution			https://new.abb.com/low-voltage/solutions/intelligent-distribution
Digital Transformation			https://new.abb.com/medium-voltage/by-customer-segment/abb-ability
Micro Grids			https://new.abb.com/low-voltage/solutions/smart-power-solutions-for-microgrids
Arc-flash Protection and Mitigation			https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation

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

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5.17 Basic Power Systems Studies for Electrical Engineers

Competency	Learning Area	Applicability
Engineering Technical Expertise Engineering Solutions	Basic Power Systems Studies for Electrical Engineers	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 my knowledge, judgement & expertise to achieve/ implement effective (efficient and high quality) and safe results/solutions.
- apply my knowledge, judgement & expertise to understand customer infrastructure and needs.
- identify, improve, and deliver engineering solutions that meet business needs and add value to customer.

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

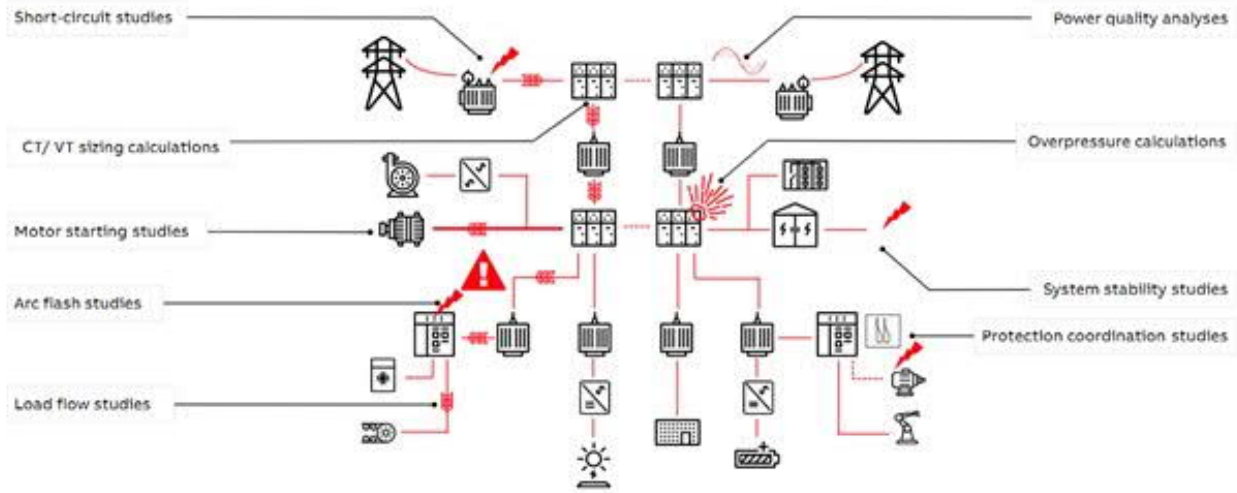
What are the suggestions/examples to apply this learning on-the-job?

- 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".

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)



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

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Power Studies			https://go.insideplus.abb.com/business-areas-and-divisions/electrification/divisions/distribution-solutions/product-groups/packaging-and-solutions/power-studies-and-consulting
ABB Selectivity website			https://new.abb.com/low-voltage/solutions/selectivity
Power Quality			https://new.abb.com/low-voltage/launches/power-quality
Arc-flash Protection and Mitigation			https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation
ABB Switchgear Manual			
Electrical installations of buildings			IEC 60364
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 New LMS – “My Learning”

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5.18 Design for Excellence

Competency	Learning Area	Applicability
Engineering Solutions	Design for Excellence	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 engineering solutions that meet business needs and add value to customer by applying Lean Engineering/ Design for Excellence methods.

What are the Learning Area Objectives?

To understand:

- How to assure the engineering solution offered is meeting the Customer needs
- How to assess and decide on the solution to be provided to a Client? (Decision maker)
- How to maximize the value to Customer
- How to modularize your engineering solutions
- What are the most important factors when proposing technical solutions to the Customer (Cost, technical specifications, delivery, design for manufacturing, modular thinking, standards etc.)
- How to ensure your solution is designed for safe, reliable, and cost-effective manufacturing

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

- Initiate a Lean Six Sigma/Design for Excellence Project, project.

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Design for Excellence – II

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Introduction to Design for Excellence Webinar	9CSC014558-GLB-EN		
Customer Focus			Customer Focus Harvard ManageMentor (myhbp.org)
Design Thinking - Double Diamond Model	9CSC017090-GLB-EN		

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

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5.19 Switchgear Applications

Competency	Learning Area	Applicability
Engineering Solutions	Switchgear Applications	Senior Project Engineer and above

<p>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)</p> <ul style="list-style-type: none"> I will be able to identify, improve and deliver engineering solutions that meet business needs and add value to customer.
<p>What are the Learning Area Objectives?</p> <ul style="list-style-type: none"> To understand switchgear applications for different segments e.g., Data Centers, Smart Grids.
<p>What are the suggestions/examples to apply this learning on-the-job?</p> <ul style="list-style-type: none"> Actively engage with Business Development team to learn a new segment / application. Participate in best practice sharing sessions from other local engineering units.
<p>What are the suggestions/examples to apply this learning off-the-job?</p> <p>This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by</p> <ul style="list-style-type: none"> Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings) Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Switchgear Applications

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Data Centers			https://new.abb.com/data-centers https://new.abb.com/data-centers/powerdistribution
Grid Automation - Smart power distribution solutions			https://new.abb.com/medium-voltage/distribution-automation/grid-automation-solutions
Arc-flash Protection and Mitigation			https://new.abb.com/low-voltage/launches/arc-flash-protection-and-mitigation
Power Quality			https://new.abb.com/low-voltage/launches/power-quality
Direct Current Systems			https://new.abb.com/low-voltage/direct-current-systems https://new.abb.com/medium-voltage/switchgear/railway-switchgear/dc-traction-power-supply
Customer Segments			https://new.abb.com/medium-voltage/by-customer-segment

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

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5.20 Facilitating Skills

Competency	Learning Area	Applicability
Consulting and Facilitating	Facilitating Skills	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

- enrich the operation of other organizations using my own expertise.
- establish partnering relationships and builds mutual commitment.
- facilitate the consultation process to achieve good results.

What are the Learning Area Objectives?

To understand:

- How to enrich the operation of other organizations using my own expertise.
- How to establish partnering relationships and builds mutual commitment.
- How to facilitate the consultation process to achieve good results.

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

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

This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Data Driven Engineering- II

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Design Thinking - Double Diamond Model	9CSC017090-GLB-EN		
Design Thinking Playbook Written by Michael Lewrick, Patrick Link, Larry Leifer			
Customer Focus			Customer Focus Harvard ManageMentor (myhbp.org)

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

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5.21 Consulting Skills

Competency	Learning Area	Applicability
Consulting and Facilitating	Consulting Skills	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

- enrich the operation of other organizations using my own expertise.
- establish partnering relationships and builds mutual commitment.
- facilitate the consultation process to achieve good results.

What are the Learning Area Objectives?

To understand:

- How to enrich the operation of other organizations using my own expertise.
- How to establish partnering relationships and builds mutual commitment.
- How to facilitate the consultation process to achieve good results.

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

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


This ELDS Project Engineering Learning Catalogue has off-the-job development opportunities/ suggestions to learn this competency by

- Formal training (eLearning, Webinars, or where feasible locally organized face-to-face/physical trainings)
- Self-study (studying the published information on ABB Internet/Intranet, reading books etc..)

Off-the-job development opportunities for Learning Area - Data Driven Engineering- II

Learning Area Topic	Course Code	Approx. Duration	Link (if any)
Customer Focus			Customer Focus Harvard ManageMentor (myhbp.org)
Coaching			Coaching Harvard ManageMentor (myhbp.org)
Negotiation skills			Negotiating Harvard ManageMentor (myhbp.org)
Persuading Others			Persuading Others Harvard ManageMentor (myhbp.org)

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

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Revision History

Rev .A 31st July 2018

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

Rev. B 27th 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 16th 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.