



Transformers
ACADEMY

POWER TRANSFORMER SPECIFICATIONS

COURSE AUTHORS:
MARCOS FERREIRA AND JUAN ALBIGER



MARCOS FERREIRA

Marcos Ferreira is an Electrical Engineer with more than 35 years of diversified corporate experience in designing, managing, and coordinating projects in transmission, distribution, and communications in Massachusetts, Texas, Ohio, Oregon, Washington and California, as well as all Canadian provinces.

He has worked on the new installation and replacement of HV substation equipment, such as transformers, circuit breakers, etc., based on standard design, including system protection, and commissioning. During his career he worked as a senior maintenance engineer for Bonneville Power

Administration and a senior field engineer for Doble Engineering, specializing in testing HV substation equipment and providing technical support.

He has taken on the role of a project manager at United States Beale Air Force Base, North California, as part of the Civil Engineer Squadron team. Furthermore, he most recently started working for Quanta Technology, LLC, as Principal Advisor, part of the Asset Management Team.

He has been involved in IEEE Transformer Standards Committee Meetings for the past 22 years. In 2019, he was appointed as Chair for the working group of Std. C57.152 (IEEE Guide for Diagnostic Field Testing of Fluid-Filled Power Transformers, Regulator, and Reactors). Most recently, he took the role of the Vice-Chair of Standards Subcommittee.



Marcos Ferreira



Juan Albiger

JUAN ALBIGER

Juan Albiger is an Electrical Engineer with over 15 years of experience in the Power Transformer Procurement Process.

He is specialized in HV Substation Equipment: preparing technical specifications, performing factory inspections, and managing commissioning and maintenance.

Mr. Albiger is Grid Solutions Manager in a global company responsible for large scale PV projects grid connections.

He was also Head of the Power Transformer Department, responsible for ensuring the procurement and commissioning of high voltage substation equipment, power transformers and reactors that are fit for purpose.



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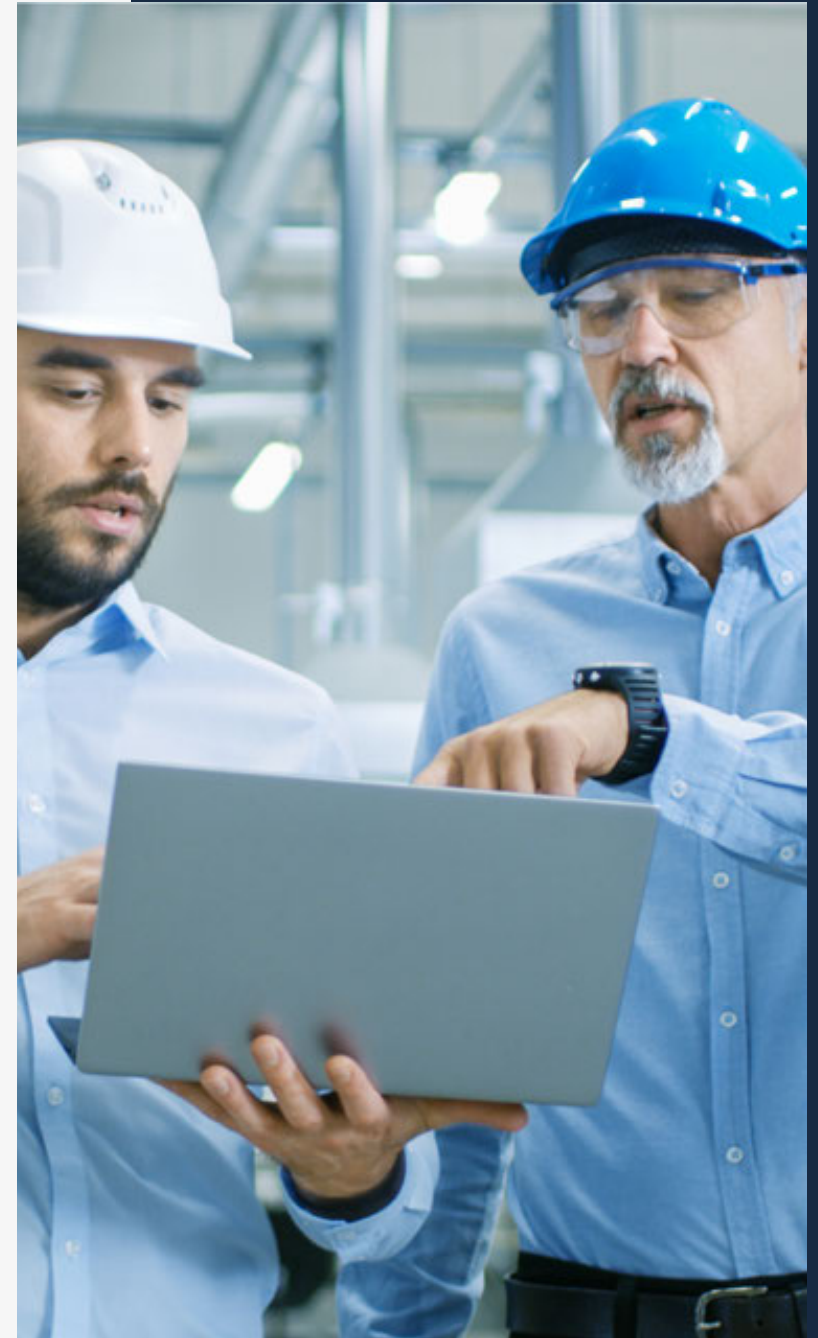
WHAT MAKES THIS COURSE UNIQUE?

Knowledge & information exceeding electrical engineering books.

Our authors will provide instructions for becoming a true expert, regardless of your previous level of experience; all you need to have is the will to learn.

TARGET AUDIENCE

- Utility engineers, both young and senior, especially those responsible for the power transformers design, specification, procurement, maintenance, and operations
- Power transformer manufacturers, technical sales personnel and sales representatives, testing and service companies of power transformer and its accessories, including on-line monitoring systems





BASIC LEVEL

LESSON 1

Define specifications and understand table of contents breakdown

- Theory of Methodology to Define Specifications
- Table of Contents of Transformer General Specification Breakdown

LESSON 2

Prepare and issue technical specifications for power transformers

- Transformer Procurement Process
- Preparing and Issuing Technical Specifications



INTERMEDIATE LEVEL

LESSON 1

Transformer special technical requirements based on the application

- Recommended reference drawings
- Design requirements
- Online monitoring devices, sensors & DGA
- Noise control
- Guaranteed performances

LESSON 2

Quality management, inspections and testing

- Quality assurance plan
- Inspections & tests plan
- Factory and site acceptance tests
- Reports considerations

LESSON 3

Power Transformer Specification Requirements based on Applications and Standards

- How to apply a 'Scope' based on applications and standards (e.g. IEEE, IEC, and Cigré)
- Important things as part of building specifications: (e.g., environment conditions and special considerations)
- Documents that should be part of specifications: (e.g., nameplate, instruction manuals, physical dimensions drawings, and factory testing reports)

LESSON 4

Technical Requirements for Power Transformers

- Ratings (e.g., phases, frequency, windings, impedance, short-circuit characteristics, sound levels, angular displacement, total losses – load and no-load, insulation levels, temperature rise, load conditions, and cooling classes)
- Construction (e.g., tank types, high & low voltage bushings, OLTC, DETC, and surge arresters)
- Accessories (e.g., pressure relief devices, winding & liquid temperature gauges, liquid insulation types, grounding, and sudden pressure relay)

MASTER'S LEVEL

LESSON 1

Power transformer technical specifications fundamental rules

- How to create a 'scope' based on applications, environment conditions, special considerations, and standards (e.g., IEEE, IEC, and Cigré)?
- The difference between the documentation (e.g., nameplate, instruction manual, physical dimensions drawing, and factory testing reports) to be provided by the transformer manufacturer

LESSON 2

Classification of technical requirements – 'essential versus optional'

ESSENTIAL

- Ratings (e.g., phases, frequency, windings, impedance, short-circuit characteristic, sound levels, angular displacement, total losses – load

- and no-load, insulation levels, temperature rise, load conditions, and cooling classes)
- Construction (e.g., tank types, high & low voltage bushings, OLTC, DETC, and surge arresters)
- Accessories (e.g., pressure relief devices, winding & liquid temperature gauges, liquid insulation types, grounding, and sudden pressure relay)

OPTIONAL

- Choose liquid insulation
- Choose LTC
- Choose accessories: time-based maintenance (conventional) versus condition-based maintenance (maintenance-free)
- When to consider adding DGA / bushings / OLTC online monitoring?
- What is the main difference between OLTC and DETC and when are OLTC versus DETC specified?
- What is the main difference between OLTC and VR (voltage regulator)?

LESSON 3

Specification of processes (services) for power transformers specifications

- Factory capability assessment for power transformers
- Power transformer transportation & handling specification
- Commissioning and assembling field testing specification

LESSON 4

Tender assessment and specifications

- Technical datasheet, guaranteed performances
- Economic loss evaluation
- Total ownership cost (TOC) of transformers



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