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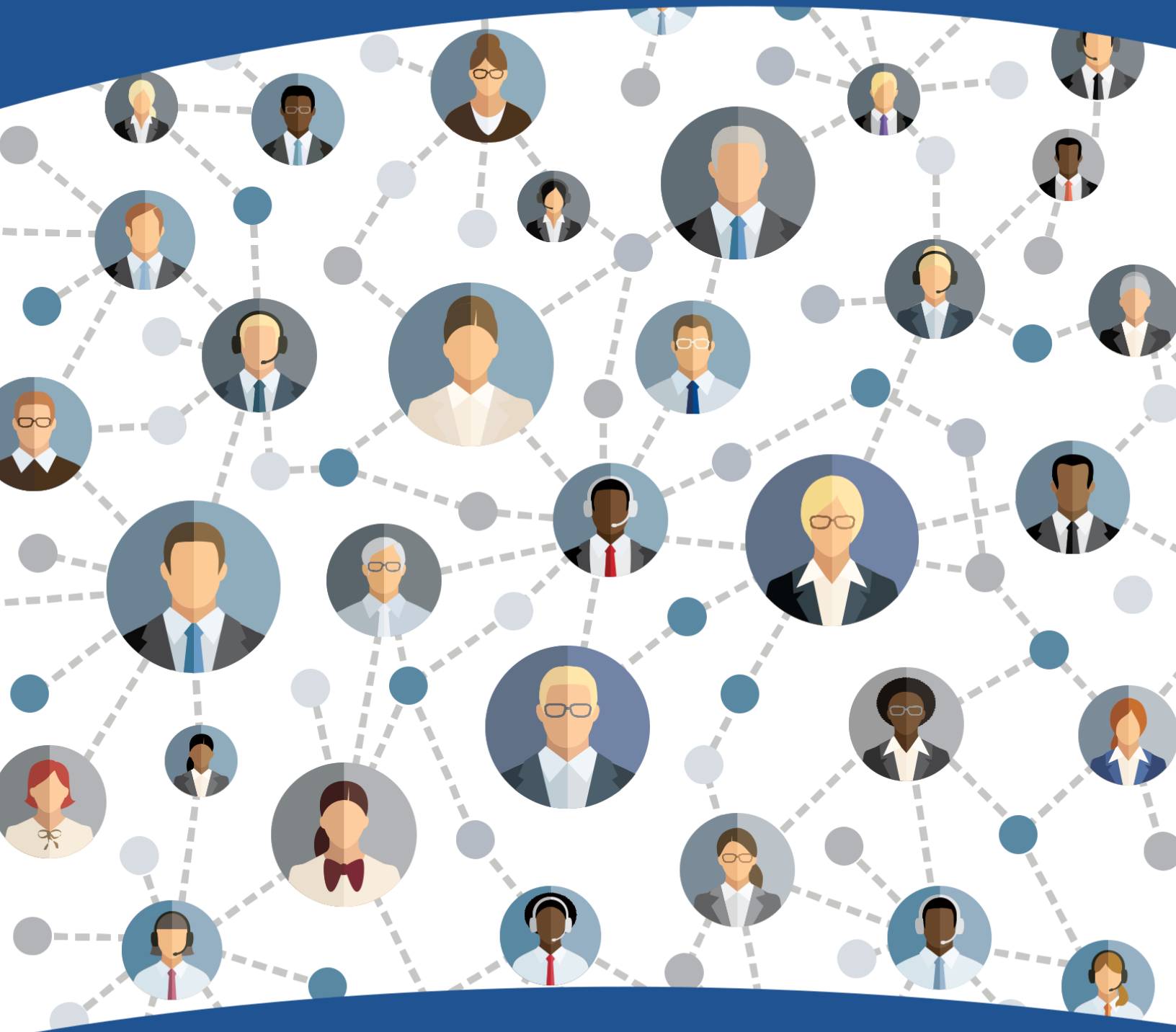

WINNER OF THE AWARD FOR THE BEST TRAINING INSTITUTE IN THE GULF

Start-up , Commissioning & Testing of Electrical Systems

INTRODUCTION

- This Start-up, Commissioning and Testing of Electrical Systems training course has been designed to provide a clear and perfect understanding to principles of commissioning and electrical installation.
- Equipment readiness for a commercial service is proven by testing all its functions under different conditions. 'Do not believe, until it is proven' is the key to successful testing and satisfactory operation of electric systems. Equipment is finally proven when it is energized and tested on load during the start-up (first energisation).
- Errors missed in previous stages of the project are discovered in the commissioning. During testing the engineers are exposed to high and low voltages and currents. In order to prevent injuries and damages, it is important that they are trained to fully understand the processes and plan all steps of the commissioning in advance.

This training course will highlight:

- Commissioning planning, process and procedures
- Commissioning inspections
- Commissioning / maintenance tests
- Start-up or first energisation
- Safety aspect of commissioning

OBJECTIVES

- The training course covers all aspects of testing in electrical systems, performed during construction or maintenance. It considers practical understanding of variety of tests and prescribes how to carefully plan and perform them. The final stage is the start-up or first energisation when equipment is connected to the system under load conditions.

At the end of this training course, participants will learn to:

- Understand the testing process
- Plan and prepare for testing
- Plan and carry out inspections
- Perform primary and secondary injections
- Plan the first energisation
- Perform phasing tests
- Consider safety aspects during testing

ORGANISATIONAL IMPACT

Upon completion of the training course the organizational impact would be:

- Train staff to be able to carry out testing and commissioning
- Make the participants aware of equipment testing either during a project construction or maintenance
- The course will allow delegates to interact and gain knowledge from shared experience
- The staff will understand the concept of the equipment testing and appreciate its importance in operation and maintenance of an electrical power system
- Awareness of safety during testing and commissioning

PERSONAL IMPACT

On successful completion of this training course, delegate will be able to understand:

- Learn the testing process
- Understand a step by step approach of the commissioning
- Have a comprehensive understanding of testing of HV and LV equipment
- Gain knowledge of the first energisation
- Understand the safety aspects of commissioning & testing

WHO SHOULD ATTEND?

This training course is suitable to a wide range of professionals but will greatly benefit:

- Testing Engineers/Technicians
- Maintenance Engineers/Technicians
- Managers of Engineering departments
- Consulting Engineers/Technicians
- Project Engineers
- Safety Professionals
- Others who want a solid preparation in testing & commissioning

Course Outline

Importance of Start-Up, Commissioning and Testing of Electrical Systems

- Definition of start-up, commissioning and testing
- Pre commissioning procedures
- Reasons for start-up, commissioning and testing
- Substation commissioning – gas insulated substation
- Managing commissioning with IEC 61850 and GOOSE
- Earthing system including clean earth, intrinsic safe earth and plant earth
- Major components of GIS substations
- GIS with vacuum interrupter

Commissioning Test Equipment the CPC 100, Omicron 356, CIBANO, ARCO, TESTRANO and Circuit Breakers Including Instrument Transformers

- Types of tests and equipment for commissioning
- IR test, Primary injection test, Secondary injection test
- HV test, AC hipot test, DC hipot test and connections
- Infrared and partial discharge monitoring
- Circuit breaker functional tests
- Tests for SF6 circuit breaker
- SF6 management
- Construction and test for current transformer and voltage transformers

Commissioning Test Equipment for Transformers Integrity

- Transformer noise
- Commissioning test and test equipment for power transformers
- Functional tests for power transformer
- Vector group of transformer
- Transformer oil characteristics and tests

Commissioning Test for Earthing and Lightning Systems

- Importance of earthing
- Network earthing
- Neutral earthing resistors
- Restricted earth fault
- Sensitive earth fault
- Lightning protection systems
- Commissioning testing for protection
- Numerical relays functionalities

First Energization and Commissioning Documentations

- Battery charger commissioning tests
- Commissioning switching plans
- Managing first energisation
- Switching plans
- Soak tests and phasing tests
- Commissioning certificates

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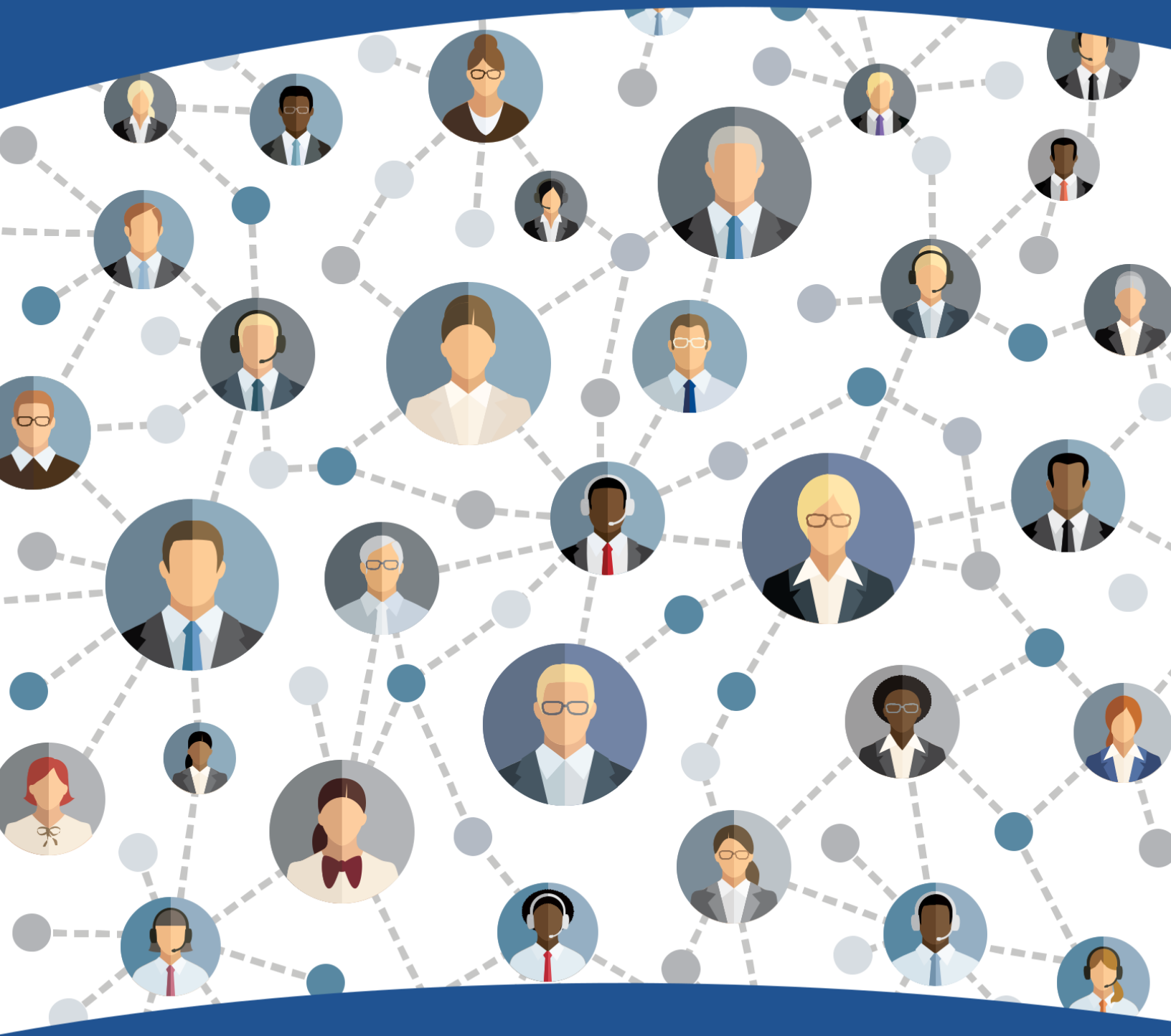

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