

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/322941699>

# On-Job Technical Training Program Framework Proposal for Newly Hired Electric Power System Engineers – A technical report and a short course

Technical Report · February 2018

DOI: 10.13140/RG.2.2.25139.12328

CITATIONS

0

READS

1,054

1 author:



Mohamed EL-Shimy

Ain Shams University

230 PUBLICATIONS 984 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Industrial electrical engineering courses for engineers and non-engineers [View project](#)



Thematic issue: Combined fuel and electricity systems for future renewable and sustainable energy sources [View project](#)

# **On-Job Technical Training Program Framework Proposal for Newly Hired Electric Power System Engineers**

**A technical report and a short course**

**By**

**Prof. Dr. Mohamed EL-Shimy Mahmoud**

**(<http://shimymb.tripod.com>)**

## ***OVERVIEW***

It is important for companies to develop a good training program to keep their staff motivated and to orient new-hires. Training may cover a wide range of reasons from new-hire training about your operation and business, to introduce new concepts to a workgroup<sup>1</sup>.

Whatever the reason for conducting a training session, it is necessary that a comprehensive, ongoing, and consistent training program be developed in order to keep your staff motivated about learning new concepts and keeping your department profitable.

A formal new-hire training program, with an overview of the job expectations and performance skills needed to perform the job functions, is an essential part of a complete training program. A new-hire training program provides essential knowledge and understanding of the position and how the position fits within the organizational structure. The new associate will better understand their impact on

---

<sup>1</sup> <http://ezinearticles.com/?The-Importance-Of-Developing-A-Training-Program-For-Your-Company&id=114536>

the organization if he or she has good background knowledge of how one workgroup interrelates with ancillary departments.

A good and reliable new-hire training program starts with the creation of a sound and comprehensive training manual. A manager or supervisor must keep the associate in mind while writing the training manual. It is also important that it is interesting, so the associate will actually read it. It is highly advisable to use graphics such as tables and to deviate from normal "corporate" language.

## ***OBJECTIVES***

The objective of this document is to provide a feasible training program framework for new-hire electrical engineers working in the modeling and simulation department in FT and PIFEC. In order to provide a high correlation between scientific theories and ETAP, both theories, including applicable standards and ETAP applications are simultaneously considered in this training framework. The expected initial background and capacity of trainees as well as the training duration and cost are considered in this proposal for maximizing the outcome and optimizing the training process.

## ***TRAINING CRITERIA AND TOPICS***

This proposal provides a training program in which theories, modeling, standards, and ETAP applications are integrated in a detailed fashion. The duration of each course is carefully set to allow for extensive discussion of theories and practical implementation of various modeling and study tasks. Trainees will be learned how to build and study the performance various models on a general purpose computer package such as MATLAB/SIMULINK. Several modeling and simulation tasks will be assigned to them. Trainees have to perform practical implementations on ETAP, including building systems, conducting studies... etc.

A short pre-course test at the beginning of each course will be conducted for evaluating the background of the trainees; however, this pre-course test may be escaped in case of fresh-graduate engineers when advanced training topics are

presented to them. In such cases, trainee's background can be evaluated through oral discussions and questions at the beginning of each course. In addition, by the end of each course, each trainee will be submitted to an examination. After each training course, each trainee will submit a detailed scientific report about the attended course. Specific tasks may be assigned to the trainees to be included in that scientific report. The trainer and the trainees have to fill an evaluation form after completing each course. This evaluation form should consider items such as course location, its scientific contents, available and used training tools and each trainee (trainer evaluation form) as well as the trainer (trainee evaluation form).

The following table lists the proposed training courses for newly hired electrical engineers, summary of the modules and duration of each course.

<b>Stage I: Essential Training Courses</b>		
<b>Course ID</b>	<b>Course Title and summary comprised modules</b>	<b>Course duration (days)<sup>2</sup></b>
1	Computer modeling for use in static analysis and dynamic analysis of electric power systems. <ul style="list-style-type: none"> <li>• Classical modeling for static analysis.</li> <li>• Advanced modeling for static analysis.</li> <li>• Classical modeling for dynamic analysis.</li> <li>• Advanced modeling for dynamic analysis.</li> <li>• Simulink based modeling, simulation, and analysis of power system models.</li> </ul>	5
2	Introduction to ETAP and building an OLD.	2
3	Load Flow Analysis.	3

---

<sup>2</sup> Based on 4 hours training day and the remaining work hours will be spent on solving assignments and preparing reports.

4	Short-Circuit Analysis	3
5	Protection Device Coordination	3
6	Arc flash analysis	2
7	Motor Acceleration Analysis	3
8	Transient Stability Analysis	4
9	Harmonic Analysis	3
<b>Essential training days</b>		<b>28</b>
<b>Stage II: Optional Training Courses (proper ETAP key should be available)<sup>3</sup></b>		
10	Optimal Capacitor Placement	2
11	Unbalanced Load Flow Analysis	3
12	Analysis and Design of Underground Raceway Systems	2
13	Analysis and Design of Cable Pulling Systems	2
14	Optimal Power Flow Analysis	3
15	DC Load Flow Analysis	2
16	DC Short-Circuit Analysis	2
17	Battery Sizing and Discharging Analysis	2
18	Analysis of Control System Diagrams	2

### ***BASIC REFERENCES***

- [1] P. M. Anderson, and A. A. Fouad, Power System Control and Stability: Galgotia publications, 1981.

---

<sup>3</sup> These training courses may be conducted based on specific project needs.

- [2] P. Kundur, Power System Stability and Control: McGraw Hill, Inc. , 1994.
- [3] A. H. El-Abiad, Power Systems Analysis and Planning: Hemisphere publishing Corporation, 1983.
- [4] J. Arrillaga, and N. R. Watson, computer modelling of electrical power systems, second edition ed.: John Wiley & Sons, LTD, 2001.
- [5] M. EL-Shimy. Dynamic Security of Interconnected Electric Power Systems - Volume 1. Lambert Academic Publishing / Omniscryptum Gmbh & Company Kg; Germany; ISBN: 978-3-659-71372-9; May, 2015.
- [6] M. EL-Shimy. Dynamic Security of Interconnected Electric Power Systems - Volume 2: Dynamics and stability of conventional and renewable energy systems. Lambert Academic Publishing / Omniscryptum Gmbh & Company Kg; Germany; ISBN: 978-3-659-80714-5; Nov. 2015.
- [7] ETAP, "ETAP help documentation," ETAP, 2010.

#### ***ADDITIONAL REFERENCES***

- [1] K. R. Padiyar, power System Dynamics: Stability and Control: John Wiley & Sons (Asia) Pte Ltd, 1996.
- [2] M. E. El-Hawary, Electrical Power Systems: Design and Analysis: Reston Publishing Co., Inc., 1983.
- [3] P. C. Krause, Analysis of Electric machinery: McGraw-Hill Book Company, 1986.
- [4] J. J. Grainger, Power System Analysis: McGraw Hill, Inc., 1994.
- [5] I. SKM System Analysis, "Industrial Power system Simulation Software," I\*SIM V3.5 Users Manual, 1992.

#### ***REQUIRED EQUIPMENT AND TRAINING FACILITIES***

1. Adequate training room.
2. MATLAB.
3. ETAP.