



Skill Development program
on

Design of Power Frequency & High Frequency Transformers and Rotating Machines for Industrial Applications



Organized by

Department of Electrical & Electronics
Engineering
Jointly with

M/s Sara Consultants
Bengaluru-560019, Website:
www.saraconsultants.com

About the Course

The program intends to provide hands on skill to the students in the area of design of energy efficient and fire resistant three phase power frequency & high frequency transformers. The course also covers design of high rating series reactors and rotating machines. The program will span for 50 hours during the sixth semester with 5 hours per week. The training will be provided by industrial experts. Students will be having hands on session and industrial trips to have a better understanding of the design of static and dynamic electrical machines.

Course description

High capacity and high efficient power Frequency transformers must be well designed in order to achieve acceptable power coupling, tight voltage regulation, and low exciting current distortion. High efficient transformers have several advantages such as minimum losses, minimal maintenance, self protected and easy of service restoration after a failure in the secondary.

High-frequency transformers operate at 400 Hz are suitable for defence and aerospace applications. Operating at a higher frequency reduces the size, less copper wire is needed, thus reducing the losses and helping to make the transformer more efficient. Minimizing the issues such as skin and proximity effects are a serious concern when designing high frequency transformers.

High efficient rotating machines are a new and mandatory trend in the motor production. The energy consumption of rotating machines in industry is almost 70% of generated electrical energy. Energy efficient motors operate at maximum efficiency even when they are lightly loaded because of their better design. These machines have lower operating cost, better tolerance to thermal and electrical stresses, ability to withstand abnormal operating conditions.

Course Objective

- To bridge the gap between the curriculum and the existing industrial practices.
- Good knowledge of design of static and rotating machines.
- Simulation of electrical machines using industrial dedicated software
- Enhance the confidence levels and acquire better chance of securing a job

Prerequisites

- Good knowledge of Construction and working principle of Transformers and Rotating machines

Participants: 6th Semester B.E. students
(EEE/ME/ECE)
(Maximum number of participants is limited to 30)

Training certificate: On successful completion of the program, students will be issued certificate jointly by Axis Global Institute of Industrial Training [AGIIT] and BNM Institute of Technology.

Course Outcomes

- At the end of the course, the students will be able to
- Understand the construction of power transformers, high frequency transformers and rotating machines
 - Design energy efficient and fire resistant high rating transformers
 - Design high power series reactors and rectifiers and rotating machines
 - Calculate the design parameters of static and rotating electrical machines as per industrial standards
 - Simulate the static & rotating machines using industrial dedicated Software

Course content (Tentative)

| Week no. | Topics to be taught |
|----------|--|
| 1 | ❖ Introduction to Transformers ❖ Design of Energy Efficient 3 phase, 100 kVA, 11000/433 V, 50 Hz, 3 Phase, Class A transformer |
| 2 | ❖ Design of Fire resistant 3 phase, 100 kVA 11000/433 V, 50 Hz, Class –F transformer |
| 3 | ❖ Assessment - I ❖ Design of Series Reactor 150 A, 433 V, 50 Hz, 5% voltage drop, Dry type for the application of Energy savings. |
| 4 | ❖ Industrial visit to learn manufacturing of different types of transformers |
| 5 | ❖ Design of 12 Pulse Rectifier 100 kVA 433/433-433 V, 50 Hz, 3/6 Phase, Class –F transformer |
| 6 | ❖ Practical (hands on) design of Transformers through software ❖ Assessment-II |
| 7 | ❖ Industrial visit to learn manufacturing of different types of transformers |
| 8 | ❖ Types of Electrical Rotating machines Insulation class, mounting & bearing types ❖ Shaft design, critical speed, unbalanced response and rotor types and windings |
| 9 | ❖ Cooling systems and design calculations ❖ Assessment - III |
| 10 | ❖ Industrial visit to learn design and manufacturing of rotating machines |