

BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

Avalahalli, Doddaballapura Main Road, Bangalore – 560064

OPEN COURSE - DAILY REPORT

Date: 12-02-2019

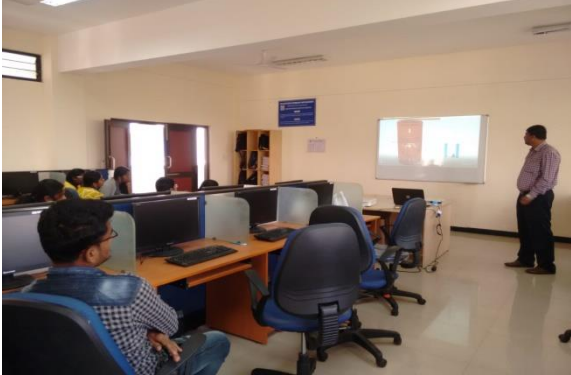
Department	Electrical and Electronics Engineering
Name of the Open Course	Transformer and Armature Winding Design
Coordinator	Dr. Madhu Palati, Mr. Manjunatha Babu P, Mr Ozwin Dsouza
Total No. of Students	21

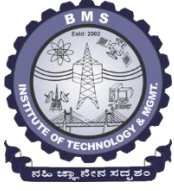
DESCRIPTION

On Day-1 Mr. Manjunatha Babu P handled the morning session. He briefed about the importance of the course, choice of good design, insulation, design aspects, Design limitations, Types of transformer windings involved.

In the afternoon Session Mr Manjunatha Babu.P explained the types of wire gauge used in the windings based on the rating of the transformer. Different types of gauge wire were given and asked the students to find the gauge and its value.

PHOTOS





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Date: 13-02-2019

Department	Electrical & Electronics Engineering
Name of the Open Course	Transformers and Armature Design
Coordinators	Dr Madhu Palati, Mr Manjunatha Babu.P and Mr.Ozwin D Souza
Total No. of Students	23

DESCRIPTION

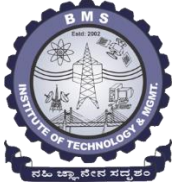
On Day-2 Mr Manjunatha Babu.P handled the morning session. He briefed about the importance of stepped core and the design steps involved. Mainly the following topics were emphasized during the presentation:

- Choice of deciding the Maximum value of Flux density
- Design of core length, core diameter, window height in a core.
- Number of steps
- Net cross sectional area of each step core
- Helical winding, cylindrical winding and its importance
- Number of turns.
- Design Procedure

In the afternoon Session Dr Madhu Palati discussed about the need of High voltage transmission, necessity of step up transformer. Power transformers and distribution transformer categorisation. Total losses in a transformer, percentage of losses. Techniques to minimize total losses, protection equipment used in a transformer to protect against internal faults. Accessories and fittings of a transformer. The resource person took the students to a field visit in BMSIT campus to show a 315kVA distribution transformer. Professor explained about the parts of transformer, Buchholz relay, silica gel breather, oil cup, magnetic oil gauze, LT terminal box.

Also the speaker explained and demonstrated :

- The overall single diagram of LT side of the complete campus
- Feeders, distributors and Service mains and Underground cable system
- Protective equipment and Load break switch for each distributor cable.
- The bus bar arrangement in the LT panel board, Main control, sub control, Earth leakage Circuit breaker and over current protection system
- In case of excessive voltage drop and low power factor switching on the 15 KVAR capacitor bank
- In case of power failure switching on the 320 kVA diesel generator
- Earthing aspects of transformer and panel
- Lightning Arrestor and its importance



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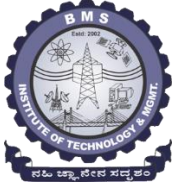
Date: 14-02-2019

Department	Electrical & Electronics Engineering
Name of the Open Course	Transformers and Armature Design
Coordinators	Dr Madhu Palati, Mr Manjunatha Babu.P and Mr.Ozwin D Souza
Total No. of Students	23

DESCRIPTION

On Day-3 The students were taken to Vignesh Vidyuth Company in Peenya. The Engineer at Vignesh Vidyuth explained and Demonstrated the following topics:

- Components in a transformer
- Different Types of transformer core joints and mitred joints,
- Different types of cross sections, legs in a core and Yoke in the core
- Construct a single core and stepped core
- Types of winding, different types of insulating materials used, Insulation between LV winding and core.
- Insulation between LV winding and HV winding.
- Importance of Spacers and Oil ducts
- Core Assembling
- Testing of Transformer, different tests include Insulation resistance test, Open circuit and short circuit test, Double voltage, double-frequency test, breakdown strength of transformer oil test
- Insulation resistance was conducted on a transformer which was subjected to 100°C in a heating furnace for 24 hours to remove the moisture. It was observed that the Insulation resistance between LV and HV winding, LV and transformer tank and HV winding and transformer winding was greater than 500 MΩ, which is an indication good insulation level.
- Open circuit test was conducted on LV side (433V) and HV test was conducted on HV side (11 kV) to determine the no load and copper losses.
- The test cell was filled with sample oil taken from a transformer and subjected to high voltage at an increased rate of 2kV/sec. It was observed that the breakdown strength of transformer oil was 27 kV, which is an acceptable limit (> 25 kV).



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OPEN COURSE - DAILY REPORT

OPEN COURSE - DAILY REPORT

Date: 15-02-2019

Department	Electrical & Electronics Engineering
Name of the Open Course	Transformers and Armature Design
Coordinators	Dr Madhu Palati, Mr Manjunatha Babu.P and Mr.Ozwin D Souza
Total No. of Students	23

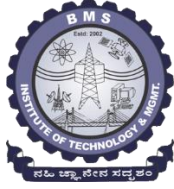
DESCRIPTION

On Day-4 Mr Manjunatha Babu.P handled the morning session. He briefed about the DC machines, parts of a DC machine and during his presentation the following topics were discussed in depth:

- Need of Armature
- Design procedure
- Types of windings used
- Lap winding
- Wave winding
- Single layer winding
- Double layer winding
- Winding table
- Connections
- Front pitch
- Back pitch
- Average Pitch
- Winding table
- Pitch calculation
- Developing lap winding and wave winding for a given data

In the afternoon Session Mr Manjunatha Babu.P explained the implementation of winding diagram in AutoCAD software. Introduction to software, commands used to draw the lines, copying the lines, trimming the crossing lines, entering the Text, naming the poles, showing the direction of winding, rotating the lines, hatching the poles, connecting the end

connections of winding to commutator segment. Brush locations and end connections to the brushes. Marking the end connections. Also Drawing the double layer winding was taught and students were given hands on experience to learn this software.



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OPEN COURSE - DAILY REPORT

Date: 16-02-2019

Department	Electrical & Electronics Engineering
Name of the Open Course	Transformers and Armature Design
Coordinators	Dr Madhu Palati, Mr Manjunatha Babu.P and Mr.Ozwin D Souza
Total No. of Students	23

DESCRIPTION

On Day-5 Mr Manjunatha Babu.P handled the morning session. He briefed about the wave winding in DC machines and case studies. Students were given hands on session for developing a wave winding for a given DC machine with different poles, different conductors, and different number of slots. After the short break students were given Quiz to assess the Open course outcome and also feedback was taken.

PHOTOS



Mr. Manjunatha Babu P

Dr. Madhu palate

Mr. Ozwin Dsouza

Department Open Course Coordinator

Dr. N Rama Rao

HoD