

NIRMA UNIVERSITY
Institute of Technology
B. Tech. in Electrical Engineering
Semester – VI

L	T	P	C
2	0	2	3

Course Code	2EEDE56
Course Title	Testing and Commissioning of Electrical Equipment

Course Outcomes (COs):

At the end of the course, student will be able to -

1. test various electrical equipment as per standards or guidelines and analyze results
2. apply the process of commissioning
3. appreciate and evaluate various maintenance techniques
4. apply and assess various condition monitoring techniques

Syllabus

Teaching Hours: 30

Unit-1: Introduction	02
Overview of maintenance schemes, Introduction of electrical preventive maintenance and testing program, Types of tests, Standards for electrical equipment testing	
Unit-2: DC and AC Testing of Insulation of Electrical Equipment	05
Types and class of insulation, Comparison between ac and dc testing, testing of cables, insulators, bushings, lightning arresters, Analysis of results	
Unit-3: Testing, commissioning and maintenance of Rotating Machines	08
Drying out methods, Slot discharge test, Temperature rise test, High Voltage Test, Partial discharge test, IR test, Efficiency tests as per IS, Air-gap eccentricity, Special care for variable frequency drive (VFD) fed motors, Machine installation, Commissioning in rotating machine, Operating instructions & maintenance procedures	
Unit-4: Testing, commissioning and maintenance of Transformers	08
Transformer tests: Polarity test, Transformer turns ratio (TTR) test, Vector group test, Induced potential test, Separate source voltage test, Power frequency test on windings, Impulse test, Short circuit test, Zero sequence test, Noise level test, Transformer oil test, Transformer transportation issues, Commissioning steps, General maintenance procedures	
Unit-5: Introduction to condition monitoring techniques	07
Need of condition monitoring, Off – line and online monitoring of electrical equipment, Signature analysis, Dissolved gas analysis (DGA), Furan analysis, Frequency response analysis, Fault diagnostic method, Non-electrical condition monitoring techniques, basics of remnant life analysis	

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

This shall consist of at least 10 laboratory experiments based on the syllabus.

Suggested Readings:

1. Paul Gill, Electrical Power Equipment Maintenance and Testing, CRC Press.
2. Sivaji Chakravorti, et al, Recent Trends in the Condition Monitoring of Transformers: Theory, Implementation and Analysis, Springer
3. Hamid A. Toliyat, et al, Electric Machines: Modeling, Condition Monitoring and Fault Diagnosis, CRC Press
4. S. Rao, Testing, Commissioning, Operation and Maintenance of Electrical Equipment, Khanna Publications.
5. G. C. Stone, E. A. Boulter, I. Culbert and H. Dhirani, Electrical Insulation for Rotating Machines, IEEE Press, Wiley Interscience.
6. Indrajit Dasgupta, Power Transformers Quality Assurance, New Age Publishers.
7. Prevalent standards, product literature and manuals.

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. academic year 2020-21 and onwards