

Transformers and Generators Lab

COURSE MODULES OF THE SUBJECT TAUGHT FOR THE SESSION ODD SEM AY 2026-27

Course Code	1BEEL306	Scheme	2025
Type of Course	Professional Core Course Lab	Semester	III
Teaching Hours/Week (L:T:P)	0:0:2	CIE Marks	50
Total Hours of Pedagogy L:T:P: (SL&TW)	0:0:28:2	SEE Marks	50
Credits	01	Total Marks	100
Examination type (SEE)	Practical	Exam Hours	3

Syllabus

Sl. No.	List of Experiment
1	Open-circuit and short-circuit tests on a single-phase step-up/step-down transformer and predetermination of: (i) Efficiency and regulation, and (ii) Parameters of the equivalent circuit.
2	Polarity Test and Star–Delta Connection of Three Single-Phase Transformers with Efficiency and Regulation under Balanced Load.
3	Determination of Combined and Individual Transformer Efficiencies using Sumpner’s Test.
4	Parallel operation of two dissimilar single-phase transformers of different kVA ratings and determination of load sharing
5	Separation of hysteresis and eddy current losses in a single-phase transformer
6	Comparison of performance of three single-phase transformers in delta–delta and V–V (open-delta) connections under load
7	Scott connection for conversion of 3 phase supply to 2 phase supply and plot of secondary side voltages with respect to load variation
8	Direct load test on a three-phase synchronous generator to determine efficiency and regulation
9	Determination of voltage regulation of an alternator by the EMF and MMF method
10	Determination of power-angle characteristics of a synchronous generator and determination of maximum power developed
11	Performance of a synchronous generator connected to an infinite bus under constant load and variable excitation
12	Slip test and determination of X_d and X_q .

Laboratory Course Outcomes

- CO1:** Conduct standard tests on single-phase and three-phase transformers and determine equivalent circuit parameters and performance(L3)
- CO2:** Analyse the performance of transformers under different operating conditions (L4)
- CO3:** Perform experimental investigations on synchronous generators and determine their performance(L3)
- CO4:** Evaluate the voltage regulation of synchronous generators using different standard methods and compare the results obtained. (L5)
- CO5:** Determine the steady-state operating characteristics of synchronous generators (L4)

CO–PO-PSO Mapping Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	3	2	1	1	3	2	–	1	3	2
CO2	3	3	1	3	2	1	1	3	2	–	1	3	2
CO3	3	2	1	3	2	1	1	3	2	–	1	3	2
CO4	3	3	1	3	2	1	1	3	2	–	1	3	2
CO5	3	3	1	3	2	1	1	3	2	–	1	3	2

CO–Experiment Mapping

CO	RBT Level	Experiments Mapped
CO1	L3	1, 2, 3, 5
CO2	L4	4, 6, 7
CO3	L3	8
CO4	L5	9
CO5	L4	10, 11, 12

List of Textbooks:

1. Electric Machines, D. P. Kothari, et al, 4th Edition, 2011.
2. Electric Machines, Ashfaq Hussain, Dhanpat Rai & Co, 2nd Edition, 2013.
3. Electric Machinery, P.S. Bimbhra, Khanna Publishers.
4. Theory & Performance of Electrical Machine, J.B. Gupta, S.K. Kataria & Sons.