

Department of Electrical Engineering

Rajasthan Technical University Kota

(Lecture Plan for Odd Semesters of Session 2015-16)

Name of Teacher: D. K. Yadav

Subject: Electrical Machines-I

Class: III Sem., B. Tech. (EE)

Scheduled Lectures: 03 per week

Lecture No.	Topics to be covered
UNIT-4 (Single Phase Transformers)	
1	Types and construction of single phase transformers, laminations, construction of core and windings.
2	Operating principle and development of constant flux in a transformer core.
3	EMF equation of a transformer, per turn emf, step up and step down of voltage.
4	Open and short circuit tests, development of equivalent circuit of a X-mer.
5	Phasor diagram, Sumpner's back to back test.
6	Voltage regulation, power output, ratings and applications of 1- Φ X-mers.
7	Efficiency, losses, condition for maximum efficiency, all day efficiency, parallel operation of transformers.
8	Auto X-mers, welding X-mers, current and voltage X-mers, separation of losses.
UNIT-5 (Polyphase Transformers)	
9	Construction, various connections and phasor groups of 3- Φ X-mers.
10	Choice of connections, open delta connection, Scott connection.
11	3 to 2 and 2 to 3 phase conversion.
12	Parallel operation and its essential conditions, applications.
13	3 to 6 phase conversion, excitation phenomenon in X-mers.
14	Magnetizing harmonic currents and their effects.
15	Switching currents, inrush of magnetizing current.
16	Three winding transformer and its equivalent circuit.
UNIT-2 (DC Generators)	
17	Introduction, types of construction and generators.
18	Types of windings (lap and wave), dummy coils, pitches of coils.
19	Equivalent circuits of DC generators, emf equation, armature reaction.
20	Commutation, methods of improving commutation, equalizer rings.
21	Demagnetizing and cross-magnetizing ampere turns.
22	Various characteristics of shunt, series and compound generators.
23	Voltage build up, losses and efficiency
24	Condition for maximum efficiency, applications of DC generators.
UNIT-3 (DC Motors)	
25	Introduction, operating principle, back emf.
26	Torque equation, types and characteristics of DC motors (series, shunt and compound)
27	Speed control of DC shunt motor by field flux and armature voltage control.
28	Basic idea of solid state devices in controlling DC motors.

29	Starting of DC motors, three point starter.
30	Four point starter, losses and efficiency.
31	Testing (brake test and Swinburnes test) of DC motors
32	Electric braking and applications of DC motors.
UNIT-1 (Magnetic Circuits/Electromechanical Energy Conversion)	
33	Magnetic circuits, flux, MMF.
34	Magnetic field strength, permeability, reluctance.
35	Analogy between electric and magnetic circuits, B-H curve.
36	Hysteresis, series and parallel magnetic circuits.
37	Practical magnetic circuits, permanent magnets and their applications.
38	Basic principle of electromechanical energy conversion, conversion of energy.
39	Physical phenomenon involved in conversion.
40	Energy balance, energy stored in magnetic field.
<p>Note: The above schedule of lectures is tentative and may vary if students demands more explanation on a particular topic or due to unavoidable circumstances.</p>	

D. K. Yadav

Associate Professor

EED, RTU, Kota