



Maharaja Agrasen Institute of Technology

(Approved by AICTE & Affiliated to GGSIP University, New Delhi)

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Department of Electrical & Electronics Engineering

Electrical Machine Design Theory (ETEL-405)

ACADEMIC PLAN FOR SEMESTER-VII 2022

S.No.	TOPICS TO BE COVERED	Total No. of Lectures (42)	CO
UNIT-I(Signals & Systems)			
1	General Concepts: Major considerations in Design of Electrical Machines Electrical Engineering Materials, Space factor.	2	CO1
2	Choice of Specific Electrical and Magnetic loadings, Thermal considerations, Heat flow, Temperature rise, Rating of machines, Standard specifications.	2	
3	DC Machines: Output Equations, Main Dimensions, Magnetic circuit calculations, Carter's Coefficient.	3	
4	Net length of Iron, Real & Apparent flux densities, Selection of number of poles, Design of Armature.	2	
5	Design of commutated and brushes, performance prediction using design values.	2	
UNIT-II (Transient Analysis)			
7	Transformers: Output Equations, Main Dimensions.	2	CO2
8	KVA output for single and three phase transformers, Window space factor, Overall dimensions.	2	
9	Operating characteristics, Regulation, No load current.	2	
10	Temperature rise in Transformers, Design of Tank.	3	
11	Methods of cooling of Transformers.	2	
After Mid Term			
UNIT-III(Two-Port Networks)			

13	Induction Motors: Output equation of Induction motor,	2	CO3
14	Main dimensions, Length of air gap, Rules for selecting rotor slots of squirrel cage machines.	2	
15	Design of rotor bars & slots, Design of end rings, Design of wound rotor.	2	
16	Magnetic leakage calculations, leakage reactance of polyphase machines.	2	
17	Magnetizing current, short circuit current, Circle diagram, Operating characteristics.	2	
UNIT-IV(Network Synthesis and Passive Filters)			
18	Synchronous Machines: Output equations,	2	CO4
19	choice of loadings, Design of salient pole machines, Short circuit ratio, shape of pole face, Armature design, Armature parameters,	3	
20	Estimation of air gap length, Design of rotor, Design of damper winding,	2	
21	Determination of full load field mmf, Design of field winding, Design of turbo alternators, Rotor design	3	

Course Objectives

C.406.1	Design of various components of dc machine.
C.406.2	Design of different components of transformer.
C.406.3	Design of different components of induction motor.
C.406.4	Design of different components of synchronous machine.

