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Department of Electrical Engineering	
Electrical Machines I (63323)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Electrical Circuits II (63212)

Course Contents

Single phase and three phase transformers. DC machinery fundamentals. Dc generators. Parallel operation of DC generators. DC motors. Calculations of DC generators and motors

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	The ability to Understand the principle of operation of transformers and DC machines.	A	30 %
2	The ability to Learn different characteristics of DC machines to control them	B	30 %
3	The ability to Solve practical and design perspective problems related to transformers and DC machines.	E	40 %

Textbook and/ or Refrences

Electric machinery fundamentals. Stephen J. Chapman. McGraw-Hill &Electric machinery. A.E.Fitzgerald, Charles Kigsley, and A. Kusko. McGraw-Hill.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Homeworks	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	TRANSFORMERS: Types and construction of transformers, the ideal transformer.
2	REAL SINGLE PHASE TRANSFORMERS: Theory of operation, the equivalent circuit, calculation of voltage regulation and efficiency.
3	THE PER UNIT SYSTEM OF A TRANSFORMER: calculation of different practical problems. The Autotransformer.
4	THREE PHASE TRANSFORMERS: different types, calculations. Transformer ratings.
5	DC MACHINERY FUNDAMENTALS: construction of DC machines, induced voltage and torque in a single turn, commutation and armature reaction.
6	FUNDAMENTALS OF REAL DC MACHINES: the internal generated voltage and induced torque equations in real DC machines, power flow and losses in real DC machines.
7	MIDTERM EXAM 1
8	DC GENERATORS: different types, the magnetization curve, the separately excited DC generator.
9	DC GENERATORS: the shunt DC generator, the series DC generator, solving different problems.
10	DC GENERATORS: the cumulatively compounded DC generator, the differentially compounded generator. Parallel operation of DC generators. Solving different problems.
11	DC MOTORS: different types, the separately excited DC motor, and the shunt DC motor equivalent circuits, solving different problems.
12	DC MOTORS: the sires DC motor, the compounded motor. DC motor efficiency

	calculations.
13	MIDTERM EXAM II
14	STARTING OF DC MOTORS: DC motors starting circuits.