

No	Information of every subject	
1	Unit name:	ELECTRICAL MACHINE DESIGN
2	Code:	EP 41021
3	Classification:	Engineering subject
4	Credit value:	2.5
5	Semester/ Year Offered:	1/4
6	Pre-requisite:	
7	Mode of delivery:	Lecture, Tutorial
8	Assessment system and breakdown of marks:	
	Test	20%
	Mid-term Examination	30%
9	Academic staff teaching unit:	
10	<p>Course outcome of unit:</p> <p>In this course students will be able</p> <ul style="list-style-type: none"> • To describe the magnetic circuit, electric circuit and design theory involved in the design of electrical machines. • To describe the ampere turns requirement and calculation for the electrical machine • To explain all important aspect of windings of rotating electrical machine • To design the transformers with required specification. 	
11	<p>Synopsis of unit:</p> <p>EP-4021: The course covers the design the machines. The course introduces four chapters. Chapter 4 is devoted to explain the magnetic circuit calculations involved in the design of electrical machines. A small chapter is include as chapter 5. In chapter 6 all important aspect of windings of rotating electrical machine has been take up. The design of transformer is explained in chapter 7. Complete sample designs of distribution and power transformers are work out. This course is also intended to serve the need of Electrical Engineers in the field of Electrical Machine industries.</p>	

	<p>Topic:</p> <p>Chapter Title</p>
	<p>Chapter. 4 Magnetic Circuit Calculations</p> <p>4.1 Review of magnetic circuit formulas</p> <p>4.2 Magnetization characteristics</p> <p>4.3 Core loss</p> <p> 4.3.1 Hysteresis loss</p> <p> 4.3.2 Eddy current loss</p> <p> 4.3.3 Total iron loss</p> <p> 4.3.4 Iron loss curve</p> <p>4.4 Permissible flux densities</p> <p>4.5 Estimation of total mmf</p> <p> 4.5.1 Mmf for the air gap</p> <p> 4.5.2 mmf for teeth</p> <p> 4.5.3 Estimation of mmf for tapered teeth</p> <p> 4.5.4 True and apparent tooth densities</p> <p>4.6 Magnetizing current</p> <p>4.7 Magnetic circuit leakage and calculation</p> <p> 4.7.1 Leakage flux</p> <p> 4.7.2 Leakage reactance</p> <p> 4.7.3 Leakage reactance in transformer</p> <p> 4.7.4 Leakage reactance in rotation machine</p> <p>Chapter. 5 Electromagnetic</p> <p>5.1 Introduction</p> <p>5.2 Magnetic pull or force</p> <p>5.3 The ampere turn requirement</p> <p>5.4 Temperature rise</p> <p>Chapter. 6 Electrical Circuits: Armature windings</p> <p>6.1 Introduction</p> <p>6.2 Armature type</p> <p>6.3 Winding type</p> <p>6.4 D.C armature winding</p> <p>6.5 A.C armature winding</p>

- 6.6 The e.m.f equation
- 6.7 Armature reaction
- 6.8 Power loss in conductors

Chapter.7 Transformer

- Introduction
- Transformer type
- Constructional parts
- Core
- Core sections
- Core assembly
- Yoke section
- Windings
- Standard conductors
- The leads
- Bushings
- Cooling
- Tank
- Transformer oil
- Specification
- Output equation
- Staking factor
- Design of core section
- Selection of design constant
- Yoke dimensions
- Over all core dimensions
- Dimension of shall type transformer
- Design of winding
- Choice of winding
- Design of insulation
- Estimation of operating characteristics
- Mechanical stresses
- Effect of frequency variation
- Design of cooling system

	<p>Major design problem</p> <p>Design of welding transformer</p>
14	<p>Main references:</p> <p>EP-31021 & 32021 Electrical Machine and Operation</p>
15	<p>Additional references:</p> <p>Electrical Machine, R.K.RAJPUT, Third Edition</p> <p>Principle of Electric Machine and Power Electronic, P.C.SEN, Second Edition</p> <p>Electric Machine and Electromechanics, SYED A.NASAR, Second Edition</p>