

Industrial Electrical Systems

Course Code	19EE4601B	Year	III	Semester	II
Course Category	Program Elective	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	---
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understand the advantages and utilization of electrical systems in industries to meet societal needs. (L2)
CO2	Identify a suitable motor for electric drives and industrial applications. (L3)
CO3	Identify most appropriate heating or welding techniques for suitable applications. (L3)
CO4	Design Illumination systems for various applications. (L3)
CO5	Employ mathematical analysis considering different practical issues to design of traction system; analyze the performance parameter of the traction system. (L4)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)															
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	
CO1															
CO2	2												2	2	
CO3	2												2		
CO4	2					2							2	2	
CO5		2											2	2	

SYLLABUS		
Unit No.	Contents	Mapped CO
I	Electric Drives Type of electric drive, choice of motor, starting and running characteristics, speed control, selecting motor power rating for continuous, intermittent and short time rating duty, heating and cooling of motors, temperature rise, particular applications of electric drives, types of industrial loads.	CO1 CO2
II	Electric Heating & Electric Welding Advantages and methods of electric heating, methods of heat transfer, Stefan's law, design of heating elements, resistance heating, construction and working principle of induction furnaces, arc furnaces and dielectric heating. Types of welding, resistance and arc welding, comparison between A.C and D.C Welding.	CO1 CO3

III	Illumination Introduction, Terms used in illumination, laws of illumination, sources of light. Incandescent lamps, Discharge lamps, MV and SV lamps, fluorescent lamps- CFL-LED lamps, Types of lighting schemes, factory lighting, flood lighting and street lighting.	CO1 CO4
IV	Electric Traction-I Systems of electric traction and systems of track electrification, special features of traction motors, methods of electric braking-plugging, rheostat braking and regenerative braking, Speed-time curves for different services- trapezoidal and quadrilateral speed time curves.	CO1 CO5
V	Electric Traction-II Mechanics of train movement, Calculations of tractive efforts and power output of traction motor, Specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation and coefficient of adhesion. OHE in traction system, collectors and modern electric locomotive.	

Learning Resources
Text Books:
1. Utilization of Electrical Energy - by E. Openshaw Taylor, Orient Longman,2003. 2. Art & Science of Utilization of Electrical Energy - by Partab, DhanpatRai& Sons,12 th edition,2012. 3. Automobile Engineering by Dr Kirpal Singh , Stadard Publishers and Distributors
Reference Books:
1. Utilization of Electrical Power including Electric drives and Electric traction – byJ.B.Gupta, S.K. Kataria & Sons, . 2. Generation, Distribution and Utilization of Electrical Energy – by C.L.Wadhwa New Age international (P) Limited,Publishers,1997