



Department of Electrical Engineering

Teaching Learning and Assessment Plan

Name of Faculty: Dr. N. M. Jamadar

Subject: ELECTRICAL MACHINE-I (BTEEC302)

Semester: III

Class: SY [ELE]

Academic Year: 2024-25

Planned Duration: 01-08-2024 to 23-11-2024

Course outcome: After completing the course students will be able to

- BTEEC302_1** **Interpret** various concepts and phenomena of single-phase transformer.
- BTEEC302_2** **Discuss** various aspects and phenomena of three phase transformer.
- BTEEC302_3** **Relate** electromechanical energy conversion principles and concept of torque production in electrical machine.
- BTEEC302_4** **Illustrate** construction and working of DC generators and analyses its performance.
- BTEEC302_5** **Describe** construction and working of DC motors and analyses its performance
- BTEEC302_6** **Classify** different special purpose electric machines and its applications.

Text/Reference Books:

- A. J. B. Gupta, "Theory and Performance of Electrical Machines," S. K. Kataria & Sons, New Delhi
- B. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers
- C. B. L. Theraja, A. K. Theraja, "A text book of Electrical Technology," S. Chand Publishers
- D. Asfaq Hussein, "Electric Machines," Danpat Rai Publisher

Unit	Lecture No.	Lesson Plan	Duration	Planned Date	Conduction Date	TM	TA	AT	Reference Book	Mapping with Outcomes	
		Content Delivery								CO	PO
I	1	Transformer construction, Ideal and practical transformer	1 Hour			LT	CB, PPT	CA MSE ESE	A,C	BTEEOE70 5B_1	1,6,7,8, 10, PSO 3
	2	Exact and approximate equivalent circuits, no load and on load operation.	1 Hour						A,C		

Vision of the Department

To emerge as a center of excellence in Electrical Engineering education producing knowledgeable, employable, and ethical engineering graduates to serve industry/society

Mission of the Department

We, at Department of Electrical Engineering, are committed to achieve our vision by-

M1: Preparing technically and professionally competent engineers by imparting quality education through effective teaching learning methodologies.

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M3: Inculcating moral and ethical values in students with concern to society and environment.



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		Content Delivery								CO	PO
	3	Phasor diagrams, power and energy efficiency, voltage regulation parallel operation.	1 Hour						A,C		
	4	Effect of load on power factor, Per Unit system.	1 Hour						A,C		
	5	Excitation phenomenon in transformers, switching transients.	1 Hour						A,C		
	6	Auto transformers, Variable frequency transformer, voltage and current transformers.	1 Hour						A,C		
	7	Welding transformers, Pulse transformer and applications	1 Hour						A,C		
II	8	Constructional features of three phase transformers	1 Hour			LT	CB, PPT	CA MSE ESE	A,C	BT EEOE70 5B_4	1, 8,10,PS 03
	9	Cooling methodology	1 Hour						A,C		
	10	Standard and special transformer connections	1 Hour						A,C		
	11	Phase conversion	1 Hour						A,C		
	12	Parallel operation of three phase transformers	1 Hour						A,C		
	13	Three winding transformers and its equivalent circuit	1 Hour						A,C		
	14	On load tap changing of transformers.									

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		Content Delivery								CO	PO
	15	Modern trends in transformers, type and routine tests, standards	1 Hour						A,C		
III	16	Energy in a magnetic systems, field energy and mechanical force	1 Hour			LT	CB, PPT	CA MSE ESE	A,C	BT EEOE70 5B_2	1, 8,10,PS 03
	17	Energy in singly and multiply excited magnetic systems	1 Hour						A,C		
	18	Determination of magnetic force and torque.	1 Hour						A,C		
	19	Dynamic equations of electromechanical systems	1 Hour						A,C		
	20	Electromechanical systems and analytical techniques	1 Hour						A,C		
IV	21	Construction of armature and field systems, Working, types, e.m.f equation, Armature windings	1 Hour			LT	CB, PPT	CA ESE	A,C	BT EEOE70 5B_3	1, 8,10,PS 03
	22	Characteristics and applications,	1 Hour						A,C		
	23	Building of emf, Armature reaction - Demagnetizing and Cross magnetizing mmfs and their estimation	1 Hour						A,C		
	24	Remedies to overcome the armature reaction; Commutation process	1 Hour						A,C		

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		Content Delivery								CO	PO
	25	Causes of bad commutation and remedies, Construction of armature and field systems, Working, types, emf equation	1 Hour						A,C		
	26	Armature windings, Characteristics and applications, Building of emf, Armature reaction	1 Hour						A,C		
	27	Demagnetizing and Cross magnetizing mmfs and their estimation; Remedies to overcome the armature reaction	1 Hour						A,C		
	28	Demagnetizing and Cross magnetizing mmfs and their estimation	1 Hour						A,C		
	29	Remedies to overcome the armature reaction Commutation process, Causes of bad commutation and remedies	1 Hour						A,C		
V	30	Principles of working, Significance of back emf	1 Hour			LT	CB, PPT	CA ESE	A,C	BTEEOE70 5B_3	1, 8,10,PS 03
	31	Torque Equation, Types	1 Hour						A,C		
	32	Characteristics and Selection of DC Motors	1 Hour						A,C		
	33	Starting of DC Motors, Speed Control	1 Hour						A,C		
	34	Losses and Efficiency	1 Hour						A,C		
	35	Condition for Maximum Efficiency	1 Hour						A,C		

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		Content Delivery								CO	PO
	36	Braking of DC Motors	1 Hour						A,C		
	37	Effect of saturation and armature reaction on losses	1 Hour						A,C		
	38	Applications, Permanent Magnet DC Motors	1 Hour						A,C		
	39	Type and Routine test	1 Hour						A,C		
VI	40	Constructional details of reluctance machine	1 Hour						A,C		
	41	Variable-reluctance machines	1 Hour						A,C		
	42	Basic VRM analysis	1 Hour						A,C		
	43	Practical VRM analysis	1 Hour						A,C		
	44	Stepper motors and their analysis	1 Hour						A,C		
	45	Brushless DC motors	1 Hour						A,C		

Note: TM-Teaching Method- Lecture (LT), Laboratory Visit (LV) TA-Teaching Aids Chalk Board (CB), Power Point Presentation (PPT), Models (MD) AT- Assessment Tool-Assignments (AS), Examinations (CA, MSE, ESE), Rubrics (RB)

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Mode of Assessment

Mode	Assessment Tool	Syllabus	CO Mapped	Marks Weightage	Remark
CA	Site Visit	Unit 1 & 2	CO1, CO2	25 M	The maximum weightage shall be of 20 Marks as per University Structure
	Seminar	Unit 4,5& 6	CO4, CO5, CO6	25 M	
	Assignment	Each Unit	CO1, CO2, CO,3, CO4, CO5, CO6	50 M	
MSE	Written Exam	50% of Syllabus	CO1, CO2, CO3	20M	The maximum weightage shall be of 20 Marks as per University Structure
ESE	Written Exam	On entire syllabus of Electric Machine-I (BTEEC302)	CO1, CO2, CO,3, CO4, CO5, CO6	60 M	The maximum weightage shall be of 60 Marks as per University Structure

Course Coordinator

Academic Coordinator

HOD- Electrical

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