

Branch Name:	Electrical Engineering
Program Code	ET403
Course Name:	Electric Traction & control
Course Code:	2ET4030504
Pre-requisite Course:	

COURSE OBJECTIVE:

1. Distinguish different traction systems and latest trends in traction systems.
2. Com Differentiate services of traction system based on speed time curve.
3. Control different types of traction motors
4. Use various traction system auxiliaries.
5. Explain the distribution system of a traction system.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
4	-	2	5	60	40	20	30	150

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours	% Weightage
1 Traction Systems and Latest Trends	1.1 Present scenario of Indian Railways- High speed traction, Metro 1.2 Latest trends in traction. 1.3 Types of traction systems and their significance. Ahmadabad Metro Train 1.4 General arrangement of different types of Electric traction systems and their significance. 1.5 Selection of a traction system for a given	06	15

	application.		
2 Mechanics of Train Movement	2.1 Speed time curve related to different traction system. 2.2 Numerical based on speed time curve. 2.3 Specific energy consumption. 2.4 Factors affecting Specific energy consumption.	10	20
3 TRACTION MOTORS CONTROL & AUTOMATION	3.1 Desirable features of traction motors. 3.2 Significance of D.C. series motor over D.C. Shunt motor. 3.3 Various A.C. motors as traction motors. 3.4 Compare different traction motors. 3.5 Control methods applied to traction motors. 3.6 Types of electric braking system. 3.7 Thyristor control of Electric motors 3.8 Signal controller of Train 3.9 Alarm notification to update status of the train 3.10 Level crossing gate controller 3.11 SCADA	18	30
4 Electric Locomotives and Auxiliary Equipment	4.1 Classify electric locomotive 4.2 Function of auxiliaries in traction system 4.3 Current collecting methods in locomotives 4.4 Coach wiring and lighting devices	16	25
5 Feeding and Distribution System.	5.1 Distribution & feeder system pertaining to traction 5.2 Classify traction substations 5.3 Different methods of feeding the traction sub-station	06	10

LIST OF REFERENCES:

1. Modern Electric Traction By Pratab H, Dhanpat Rai and Sons, New Delhi.
2. Electric Traction By J. Upadhyay and S. N. Mahendra, Allied Publishers Ltd., Dhanpat Rai and Sons, New Delhi
3. www.irien.com (Indian Railways Institute of Electrical Engineering, Nasik Road)
4. www.wr.railnet.gov.in/bctweb/ELECTRICAL.htm
5. www.scrailway.gov.in

LIST OF PRACTICAL:

Sr No	Name of Practical's /Experiments
1	Types of traction system and their advantages and disadvantages
2	Speed time curve of main, urban and sub urban line services.
3	Numerical on speed time curve.
4	Numerical on specific energy consumption.
5	DC series motor as a traction motor.
6	Train Lighting system.
7	Current collecting equipment's and its application in traction.
8	Block Diagram of DC locomotive and diesel locomotive.
9	Block Diagram of AC locomotive and its equipment
10	Major Equipment in A C Traction substation
11	Prepare report on high-speed train.
12	Investigate the energy recovered using regenerative braking.
13	Calculate energy saving by series parallel control of D.C. Motor (for two and four motors).

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Distinguish different traction systems and latest trends in traction systems.	2 Understanding
CLO2	Control different types of traction motors	6 Creating
CLO3	List various traction system auxiliaries.	1 Remembering
CLO4	Common Differentiate services of traction system based on speed time curve.	2 Understanding
CLO5	Explain the distribution system of a traction system	2 Understanding 1 Remembering
CLO6	Learn about Specific energy consumption Evaluate numerical & Numerical on speed time curve.	5,3, 4 Evaluate , Applying, Analyze

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H			L	M			L		L			H	L	L
CLO2	L		L		M		L		M		H	L	H	M	L
CLO3	L						L						L		M
CLO4		M		L	L			L		H			M		M
CLO5		L	L		L	M				L		L			
CLO6	M			H			L		L		M			M	

H: High, M: Medium, L: Low