

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING AND TECHNOLOGY (DIPLOMA PROGRAMMES)									
Programme		Diploma Engineering			Branch/Spec.		Electrical Engineering		
Semester		v			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			July2018	
Subject code		1EE2504	Subject Name		Electric Traction & Control				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	04	00	01	00	05	Theory	40	60	100
Hours	04	00	02	00	06	Practical	30	20	50

Course Learning Outcomes:
<ul style="list-style-type: none"> • Distinguish different traction systems and latest trends in traction systems. • Differentiate services of traction system based on speed time curve. • Control different types of traction motors • Use various traction system auxiliaries. • Explain the distribution system of a traction system.

Theory syllabus				
UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
Unit – I Traction Systems and Latest Trends	1a. Present scenario of Indian Railways- High speed traction, Metro 1b. Latest trends in traction. 1c. Types of traction systems and their significance. 1d. Ahmadabad Metro Train 1e. General arrangement of different types of Electric traction systems and their significance. 1f. Selection of a traction system for a given application.	1.1 Present scenario of Indian Railways – High speed traction, Metro 1.2 Metro, monorail, Magnetic levitation Vehicle 1.3 Ahmadabad Metro Train 1.4 Steam, diesel, diesel-electric, Battery and electric traction system 1.5 General arrangement of D.C., A.C. single phase, 3phase phase, Composite systems 1.6 Choice of traction system - Diesel- Electric or Electric	12	12
Unit – II Mechanics of Train Movement	2a. Speed time curve related to different traction system. 2b. Numerical based on speed time curve. 2c. Specific energy	2.1 Analysis of speed time curves for main line, suburban and urban services 2.2 Simplified speed time curves. 2.3 Relationship between	12	12

	consumption. 2d. Factors affecting Specific energy consumption.	principal quantities in speed time curves 2.4 Requirement of tractive effort 2.5 Specific energy consumption and Factors affecting it.		
Unit – III Traction Motors and Their Control	3a. Desirable features of traction motors. 3b. Significance of D.C. series motor over D.C. Shunt motor. 3c. Various A.C. motors as traction motors. 3d. Compare different traction motors. 3e. Control methods applied to traction motors. 3f. Types of electric braking system.	3.1 Features of traction motors. 3.2 Significance of D.C. series motor as traction motor 3.3 A. C. Traction motors- single phase, Three phase, Linear Induction Motor 3.4 Comparison between different traction motors 3.5 Series-parallel control 3.6 Open circuit, Shunt and bridge transition 3.7 Types of electric braking system.	12	12
Unit - IV Electric Locomotives and Auxiliary Equipment	4a. Classify electric locomotive 4b. Function of auxiliaries in traction system 4c. Current collecting methods in locomotives 4d. Coach wiring and lighting devices	4.1 Important features of electric locomotives 4.2 Different types of locomotives 4.3 Current collecting equipment 4.4 Coach wiring and lighting devices	12	12
Unit – V Feeding and Distribution System.	5a. Distribution & feeder system pertaining to traction 5b. Classify traction substations 5c. Different methods of feeding the traction sub-station	5.1 Distribution systems pertaining to traction (distributions and feeders) 5.2 Traction sub-station requirements and selection 5.3 Method of feeding the traction sub- station	12	12

List of Practical	
1	Types of traction system and their advantages and disadvantages
2	Speed time curve of main, urban and suburban line services.
3	Numerical on speed time curve.
4	DC series motor as a traction motor.
5	Train Lighting system.
6	Current collecting equipments and its application in traction.

7	Block Diagram of DC locomotive and its equipments
8	Block Diagram of AC locomotive and its equipments
9	Major Equipments in AC Traction substation
10	Prepare report on high speed train.

List of Instruments/Equipments/ Trainer Board	
1	Models of different traction systems and equipment

List of Text Books			
1	Modern Electric Traction	H Partab	Dhanpat Rai and Sons, New Delhi
2	Electric Traction	J. Upadhyay S. N. Mahendra	Allied Publishers Ltd., Dhanpat Rai and Sons, New Delhi

List of Reference Books			
1	Utilization of Electrical Energy & Traction	M.A.Chaudhari S.M.Chaudhari	& Tech-Max Publication

Link of Learning Resources	
1	www.irieen.com (Indian Railways Institute of Electrical Engineering, Nasik Road)
2	www.wr.railnet.gov.in/bctweb/ELECTRICAL.htm
3	www.scrailway.gov.in