R. K. Institute of Engineering and Technology
Approved by AICTE, New Delhi and Affiliated to SCTE&VT,Odisha

ELECTRICAL ENGINEERING

SEMESTER : 5th (SEC-B)

FROM :01/07/2026 **TO** :05/11/2026

NAME OF THE FACULTY : Er. RASMITA NAYAK

SUBJECT : ELECTRICAL TRACTION

TOTAL CLASS AVAILABLE IN SEMESTER: 45 nos

NO. OF PERIODS : 03/ WEEK

Class No.	Unit	Topic / Sub-topic	Teaching Method	Learning Outcome
1	I	Course Introduction, Overview of Electrical Traction in India	Lecture + PPT	Explain the development and importance of electrical traction
2	I	Electric Drive, Diesel-Electric Drive & Battery Drive	Lecture	Compare different traction drives
3	I	Advantages & Disadvantages of Different Drives	Discussion	Evaluate the suitability of traction systems
4	I	Problems in AC Traction System: Voltage Balance & Current Balance	Lecture	Explain common AC traction problems
5	I	Harmonics, Induction Effects & Remedies	Lecture	Identify harmonic-related issues and solutions
6	I	Metro Rail System: Features, Revision & Unit Test-I	Lecture + Test	Describe metro rail features and assess Unit-I
7	II	Constituents of Traction Power Supply System	Lecture + Diagram	Identify components of the traction power supply
8	II	Traction Substation: Layout & Equipment	Lecture	Explain substation layout and equipment functions
9	II	Feeding Post: Equipment & Functions	Lecture	Describe the purpose of feeding posts
10	II	Feeding & Sectioning Arrangements	Lecture	Explain sectioning arrangements
11	II	Sectioning & Paralleling Post	Lecture	Describe sectioning and paralleling operations
12	II	Sub-Sectioning & Paralleling Post	Lecture	Explain sub-sectioning arrangements
13	II	Sub-Sectioning Post & Elementary Section	Lecture	Explain elementary sections in OHE

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14	II	Major Equipment at Traction Substations	Lecture + Charts	Identify major substation equipment
15	II	Miscellaneous Equipment at Control Posts & Switching Stations	Lecture	Explain auxiliary equipment
16	II	Protection of Traction Transformer	Lecture	Explain transformer protection methods
17	II	25 kV Catenary Construction	Lecture + Diagram	Describe 25 kV overhead traction system
18	II	Revision & Numerical/Case Study	Tutorial	Reinforce Unit-II concepts
19	II	Unit Test-II	Test	Assess Unit-II learning
20	III	Introduction to Overhead Equipment (OHE)	Lecture	Explain the purpose of OHE
21	III	Pentagonal OHE Catenary Construction	Lecture + Diagram	Describe pentagonal OHE construction
22	III	Types of Catenary Based on Speed	Lecture	Classify catenary systems
23	III	OHE Supporting Structures & Cantilever Assembly	Lecture + Drawing	Identify OHE support components
24	III	Current Collection Systems: Trolley, Bow & Pantograph	Lecture	Compare current collectors
25	III	Pantograph: Types & Construction	Lecture + Models	Explain pantograph operation
26	III	Revision & Unit Test-III	Test	Assess Unit-III learning
27	IV	Classification & Nomenclature of Electric Locomotives	Lecture	Classify electric locomotives
28	IV	Block Diagram of AC Locomotive	Lecture + Diagram	Explain locomotive subsystems
29	IV	Power Circuit of AC Locomotive	Lecture	Describe locomotive power flow
30	IV	Auxiliary Circuit Equipment (Functions Only)	Lecture	Identify auxiliary equipment
31	IV	Loco Bogie Classification & Wheel Arrangements	Lecture	Explain bogie configurations
32	IV	Maintenance of AC Locomotive Systems	Lecture	Describe maintenance procedures
33	IV	Revision & Unit Test-IV	Test	Assess Unit-IV learning

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34	V	Traction Motors: Characteristics & Requirements	Lecture	Explain desirable traction motor characteristics
35	V	Types of Traction Motors	Lecture	Compare DC and AC traction motors
36	V	Motor Control Methods	Lecture	Explain traction motor control techniques
37	V	Braking Requirements & Types	Lecture	Differentiate braking methods
38	V	Electric Braking & Regenerative Braking	Lecture + Case Study	Explain regenerative braking
39	V	Train Lighting Systems: Single & Double Battery Systems	Lecture	Describe train lighting arrangements
40	V	SG, HOG & End-on Generation	Lecture	Explain train power supply systems
41	V	Revision & Unit Test-V	Test	Assess Unit-V learning
42	VI	Signalling Systems: Requirements, Signals & Track Circuits	Lecture	Explain railway signalling principles
43	VI	Supervisory Remote Control Systems	Lecture	Describe remote control systems in traction
44	VI	Metro Rail Power Supply Systems & Indian Metro Schemes	Lecture + Case Study	Explain metro power supply arrangements
45	All Units	Overall Revision, Model Test & Doubt Clearing	Test + Discussion	Evaluate learning and prepare for examinations

R Nayak
Sign of Faculty

HOD, Elect. Engg.
R.K. Institute of Engg. & Tech
Kantapada, Niali, Cuttack

Sign of Principal
PRINCIPAL
R.K INSTITUTE OF ENGG & TECH
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