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Electric Traction — Complete Syllabus (Program Elective-3, Option 2)

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026-27
Subject 5.2.2 (Program Elective-3, Theory) • Total 100 Marks • 3 Credits • L 3 - P 0 •
Choose this OR Solar Power Technologies

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.2	Program Elective-3: Electric Traction	Theory	3 - 0	3	40	60 (3 hrs)	100
Electric Traction Total				3	40	60	100

What This Subject Aims To Do

To help students maintain electric traction systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Basics of Traction	06	14%
II	Power Supply Arrangements	08	19%
III	Overhead Equipment	07	17%
IV	Electric Locomotive	07	17%

V	Traction Motors and Train Lighting	08	19%
VI	Signalling and Supervisory Control	06	14%

Unit - I: Basics of Traction (06 Periods, 14%)

Topics: General description of Electrical Traction system in India; Advantages and Disadvantages of Electric Drive, Diesel Electric Drive, Battery Drive; Problems associated with AC traction System and remedies for it.

Unit - II: Power Supply Arrangements (08 Periods, 19%)

Topics: Traction Substation: layout, list of equipment and their functions; Miscellaneous equipment at control post or Switching station; Protection system for traction transformer and 25 kV centenary construction.

Unit - III: Overhead Equipment (07 Periods, 17%)

Topics: Different types of overhead equipments; Pentagonal OHE Centenary Construction; OHE Supporting Structure, Cantilever assembly diagram; Overhead system - Trolley collector, Bow collector, Pantograph Collector; Types and construction of pantograph.

Unit - IV: Electric Locomotive (07 Periods, 17%)

Topics: Classification and Nomenclature of Electric Locomotive; Block diagram of AC locomotive; Power Circuit of AC Locomotive; Equipment (List and Function only) used in auxiliary circuit of AC Locomotive.

Unit - V: Traction Motors and Train Lighting (08 Periods, 19%)

Topics: Desirable characteristics of traction motor; Types of motors used for traction with their characteristics and features; Control of motors used for traction and methods to control; Requirements of braking, types of braking; Electric braking, Regenerative braking; brief idea of train lighting system.

Unit - VI: Signalling and Supervisory Control (06 Periods, 14%)

Topics: Requirements of signalling systems; Types of signals, track circuits; Advantages of remote control; Systems of remote control, equipment and network; Metro rail - supply systems, advantages, schemes in India.

Reference Books (as listed in the syllabus)

- G.C. Garg, Utilization of Electric Power & Electric Traction, Khanna Book Publishing Co., New Delhi (ISBN: 978-93-86173-355) Revised Ed. 2018
- Gupta J.B., S.K. Kataria and Son, Utilization of Electric power and traction
- Partab H., Dhanpat Rai and Co, Art and Science of Utilization of Electrical Energy
- Partab H., Dhanpat Rai and Co, Modern Electric Traction
- Suryanarayana N.V., New Age International Publishers, Reprint 2010
- Open Shaw Taylor, Orient Longman Ltd., Utilisation of electrical energy
- Dr. T. D. Bisht, Ashish Sahoo, Pooja Yadav, Electric Traction, Asian Publishers, Muzaffarnagar, ISBN No. 978-93-91541-68-2

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.

