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Electric Power Transmission and Distribution — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 4th Semester • Session 2026-27

Subject 4.1 (Theory) • Total 100 Marks • 3 Credits • L 3 - P 0

Please note — cover year vs approval: BTEUP's own file for this curriculum prints “YEAR 2025-2026” on its cover, while carrying the approval line “UPDATED AND APPROVED BY BOARD OF TECHNICAL EDUCATION U.P. LUCKNOW IN C.D.C MEETING HELD ON 16.07.2026” on every page. It is filed in BTEUP's 2026-27 folder (folder2627), so it is treated here as the 2026-27 syllabus on the strength of that approval. The scheme it carries is identical, subject for subject and mark for mark, to the 2025-26 scheme.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
4.1	Electric Power Transmission and Distribution	Theory	3 - 0	3	40	60 (3 hrs)	100
Electric Power Transmission and Distribution Total				3	40	60	100

What This Subject Aims To Do

To help students maintain the proper functioning of the electrical transmission and distribution systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Basics of Transmission and Distribution	06	10%
II	AC Transmission	10	25%
III	Hvdc Transmission & Facts	08	20%
IV	Line Insulators and Underground Cables	10	25%
V	Sub-Stations & Distribution Systems	08	20%

Unit - I: Basics of Transmission and Distribution (06 Periods, 10%)

Topics: Single line diagrams of the electric supply transmission and distribution systems; Standard voltage level used in India; Classification of Transmission lines; Characteristics of high voltage for both AC and DC power transmission.

Unit - II: AC Transmission (10 Periods, 25%)

Topics: Typical Layout of A.C. Power supply scheme - Elements of a Transmission Line Over Head Line, Conductor materials and their properties, Line supports and their properties - Types of supports and their applications, Sag in overhead lines, Calculation of Sag - When the supports are at equal and unequal levels - Simple Numerical Problems; Constants of a Transmission line, Transposition of Transmission lines, Skin Effect, Ferranti Effect, Corona Formation, Factors affecting Corona, Classification of O.H. Transmission lines - Voltage regulation and Transmission Efficiency (No Numerical Problems); Concept of power factor, effects of low power factor, methods of improving low power factor: static capacitor, synchronous condenser, SVC.

Unit - III: Hvdc Transmission & Facts (08 Periods, 20%)

Topics: H.V.D.C Transmission: Layout Scheme, D.C Link configurations - Mono polar, Bipolar and Homo polar links; HVDC Converter Station (Schematic diagram only) - Integration of HVDC & Renewable energy into existing AC grids; HVDC Locations in India; FACTS: Definition, Need for FACTS controllers, Types of FACTS controllers, SVS, STATCOM, UPFC (Block diagram explanation only).

Unit - IV: Line Insulators and Underground Cables (10 Periods, 25%)

Topics: Natural insulating materials, properties and their applications-mica, asbestos, ceramic materials, glass, cotton, silk, jute, paper (dry and impregnated), rubber, bitumen, gaseous materials (air, hydrogen, nitrogen, SF₆); Line Insulators: Properties of Insulators, Materials, Types, Causes of failure of Insulators, Testing of Insulators; Potential Distribution over suspension Insulator string, String Efficiency - Methods of improving string Efficiency - Simple Problems; Underground Cables: Construction of a three core cable, Classification of cables, Cables for three phase service, Construction of Belted cable, Screened cable, Pressure cables, Laying of underground cables and cable jointing, Faults in cables, fault localization using Blavier and Loop tests.

Unit - V: Sub-Stations & Distribution Systems (08 Periods, 20%)

Topics: Sub-Stations: Classification, advantages, disadvantages and applications; Single Line diagram (layout) of 33/11KV and 11KV/400V sub-station, functions of various auxiliaries and equipments associated with it; Gas Insulated Substation (GIS); Distribution system - Requirements and parts of Distribution system, Classification; Comparison of different distribution systems (A.C and D.C, Overhead & Underground); A.C Distribution - Types - Connection schemes of AC Distribution system.

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)
- Mehta, V.K., Principles of Power System, S. Chand and Co. New Delhi, ISBN: 9788121924962
- Soni; Gupta; Bhatnagar, A Course in Electrical Power, Dhanpat Rai and Sons New Delhi, ISBN: 9788177000207
- Gupta, J.B., A Course in Power Systems, S.K. Kataria and sons, New Delhi, ISBN: 9788188458523
- Theraja, B.L.; Theraja, A.K., A Textbook of Electrical Technology Vol. III, S. Chand and Co. New Delhi, ISBN: 9788121924900
- Uppal, S.L., A Course in Electrical Power, S.K. Khanna Publisher New Delhi, ISBN: 9788174092380
- Ashish Sahu, Pooja Yadav, Transmission & Distribution of Electrical Power, Asian Publishers, Muzaffarnagar. ISBN: 978-93-5502-044-4
- Sivanagaraju S.; Satyanarayana S., Electrical Power Transmission and Distribution, Pearson Education, New Delhi, ISBN: 9788131707913
- Ned Mohan, Electrical Power System: A First Course, Wiley India Pvt. Ltd. New Delhi, ISBN: 9788126541959

- Gupta, B.R., Power System Analysis and Design, S. Chand and Co. New Delhi, ISBN: 9788121922388
- Kamraju, V., Electrical Power Distribution System, Tata McGraw-Hill, New Delhi, ISBN: 9780070151413

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Source: BTEUP 2nd Year curriculum (folder2627) — cover prints YEAR 2025-2026, but the approval line 'UPDATED AND APPROVED BY BOARD OF TECHNICAL EDUCATION U.P. LUCKNOW IN C.D.C MEETING HELD ON 16.07.2026' appears on every page (95 times); treated as the 2026-27 curriculum. 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.

