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BTEUP Electrical Engineering Syllabus 2026–27

5th Semester • 6th Semester — Complete, Subject-Wise

Diploma in Electrical Engineering • NEP-2020 • Approved 16.07.2026

What is inside: all 16 subject-wise syllabus PDFs in one file — the full 5th semester (650 marks, 20 credits) and the full 6th semester (650 marks, 20 credits, normal pathway; an Industrial Pathway is also offered — see the 6th-semester scheme). Each subject keeps its own pages, tables and reference books. **Please note:** the official curriculum gives no detailed syllabus section for the In-House Project (6.3) — no units, practicals or books are listed — so that PDF contains only the scheme figures from the curriculum. The 6th-semester Building Electrification and 5th-semester Energy Conservation and Audit PDFs also record the period mismatches found in the official document, honestly and without guessing.

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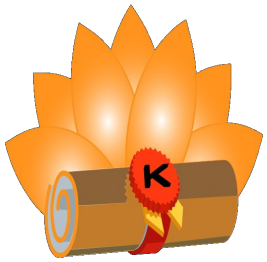
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Source: BTEUP 3rd Year Electrical Engineering curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

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5th Semester — Complete Examination Scheme

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Semester total 650 Marks • 20 Credits • (Q) = qualifying only, marks not counted for percentage/division

About this document: The full 5th-semester study and evaluation scheme as printed in the curriculum. (Q) subjects are compulsory to appear and pass, but their marks are not included for percentage and division.

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.1	Switch Gear and Protection	Theory	3 – 0	4	40	60 (3 hrs)	100
5.2	Program Elective-3	Theory	3 – 0	3	40	60 (3 hrs)	100
5.3	Energy Conservation and Audit	Practicum	2 – 4	4	60	40 (3 hrs)	100
5.4	Program Elective-4	Practicum	1 – 4	3	60	40 (3 hrs)	100
5.5	Indian Constitution (Q)	Audit Course	2 – 0	—	50	—	N/A
5.6	Electrical Estimation and Contracting	Practicum	2 – 4	4	60	40 (3 hrs)	100
5.7		Internship	—	2	60		100

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	Summer Internship (6 Weeks)					40 (3 hrs)	
#	Student Centred Activities (SCA)	Activity	0 – 10	—	50	—	50
5th Semester Total				**20**	**370**	**280**	**650**

Program Elective-3 (5.2) — Options

(1) Solar Power Technologies; (2) Electric Traction.

Program Elective-4 (5.4) — Options

(1) Electrical Testing and Commissioning; (2) Illumination Practices.

Summer Internship (5.7) — 6 Weeks, 100 Marks

Six weeks of industrial training, mandatory after the IV semester during the summer vacation. Students present a seminar/viva on their summer internship along with certificate, project and report. Internal assessment 60, external assessment 40 (3 hrs).

Student Centred Activities (SCA) — 50 Marks

Co-curricular activities like extension lectures, games, hobby clubs (e.g. photography), seminars, declamation contests, educational field visits, N.C.C., NSS, library, cultural activities and self-study. Marks distribution: 15 marks general behaviour and discipline; 10 marks attendance (75–80% = 6, 80–85% = 8, above 85% = 10); odd-semester activities (25 marks maximum): Language Lab Practices / foreign language practices, Group Discussion and Personality Development, Industrial Visits/Industrial Talks, Power Point Presentations and Resume Making, Development of Aptitude and Reasoning Skills, participation in technical exhibitions, symposiums, seminars, workshops at institute/district/state/national level.

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Switch Gear and Protection — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.1 (Theory) • Total 100 Marks • 4 Credits • L 3 – T 1 – P 0

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.1	Switch Gear and Protection	Theory	3 – 0	4	40	60 (3 hrs)	100
Switch Gear and Protection Total				**4**	**40**	**60**	**100**

What This Subject Aims To Do

To help students maintain switchgear and protection schemes used in electrical power systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Basics of Protection & Fundamental quality requirements	10	17%
II	Circuit Interruption Devices Isolators	11	20%
III	Protective Relays	13	23%
IV	Protection of Alternator, Transformer and Motors	11	20%
V	Protection of Busbar, Transmission Line and Concept of Neutral Grounding	11	20%

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Unit – I: Basics of Protection & Fundamental quality requirements (10 Periods, 17%)

Topics: Necessity, purpose and functions of protective switchgear; Characteristics of a protection system, Normal and abnormal conditions; Types of faults, their causes and effects; Protection zones and backup protection, Need of current limiting reactors and their arrangements.

Unit – II: Circuit Interruption Devices Isolators (11 Periods, 20%)

Topics: Vertical break, Horizontal break and Pantograph type; HRC fuses – Construction, working, characteristics and applications; Arc formation process, methods of arc extinction (High resistance and Low resistance), Arc voltage, Recovery voltage, Re-striking voltage, RRRV; HT circuit breakers (Sulphur-hexa Fluoride (SF6), Vacuum circuit breaker) - Working, construction; L.T. circuit breaker (Air circuit breakers (ACB), Miniature circuit breakers (MCB)) - Working and applications; Selection of LT and HT circuit breakers (ratings); Gas insulated switchgear.

Unit – III: Protective Relays (13 Periods, 23%)

Topics: Basic relay terminology - Protective relay, Relay time, Breaker time, Fault Clearing time, Pick-up, reset value, current setting, plug setting multiplier, Time setting multiplier, burden, reach; Protective relays: Classification, principle of working, construction and operation of – Electromagnetic, induction type relays; Block diagram and working of Static relays; Overcurrent relay - time current characteristics, principle of operation of - Non directional Over Current relay, Induction type Directional Power Relay, Directional Induction type Over Current relay; Introduction to Microprocessor based over current relays; Distance relaying - Principle, operation and classification of distance relays; Differential relay - operation of current balance and voltage balance differential relays.

Unit – IV: Protection of Alternator, Transformer and Motors (11 Periods, 20%)

Topics: Alternator Protection: Faults, Differential protection, Over current, earth fault, overheating protection; Transformer Protection: Faults, Differential, over current, earth fault, over heating protection, Limitations of differential protection; Buchholz relay: Construction, operation; Motor Protection: Short circuit protection, Overload protection (through thermal Relay), Single phase preventer.

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Unit – V: Protection of Busbar, Transmission Line and Concept of Neutral Grounding (11 Periods, 20%)

Topics: Faults on Bus bar and Transmission Lines; Bus bar protection: Differential and Fault bus protection; Transmission line protection: Over current, Distance and Pilot wire protection; Grounding (equipment and system), Ungrounded Neutral system, Need of neutral grounded, Methods of Neutral Grounding.

Reference Books (as listed in the syllabus)

- Mehta V. K; Rohit Mehta, Principles of Power System, S. Chand and Co., New Delhi., ISBN: 978-81-2192-496-2
- Rao, Sunil S., Switchgear and Protection, Khanna Publishers, New Delhi, ISBN: 978-81-7409-232-3
- Singh, R. P., Switchgear and Power System Protection, PHI Learning, New Delhi, ISBN: 978-81-203-3660-5
- Gupta. J. B., Switchgear and Protection, S. K. Kataria and Sons, New Delhi, ISBN: 978-93-5014-372-8
- Veerapan, N., Krishnamurty, V. R., Switchgear and Protection, S. Chand and Co., New Delhi. ISBN: 978-81-2193-212-7
- Ram, Badri; Vishwakarma D. N., Power System Protection and Switchgear, McGraw-Hill, New Delhi. ISBN: 978-07-107774-X
- Dr. T. D. Bisht, Ashish Sahoo, Pooja Yadav, Switch Gear & Protection, Asian Publishers, Muzaffarnagar, ISBN No. 978-93-91541-62-0

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Solar Power Technologies — Complete Syllabus (Program Elective-3, Option 1)

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.2.1 (Program Elective-3, Theory) • Total 100 Marks • 3 Credits • L 3 – P 0 • Choose this OR Electric Traction

Note: In the PDF the recommended books list ends with a blank entry numbered "6." — no sixth book is named, so it is not included here.

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.2	Program Elective-3: Solar Power Technologies	Theory	3 – 0	3	40	60 (3 hrs)	100
Solar Power Technologies Total				**3**	**40**	**60**	**100**

What This Subject Aims To Do

To help students maintain the efficient operation of various types of solar power technologies.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Solar Energy	06	14%
II	Concentrated Solar Power (CSP)	08	18%

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III	Solar PV Panel and Installation	10	25%
IV	Solar PV Electronics	10	25%
V	Solar PV Off-grid and Grid Tied Systems	08	18%

Unit – I: Solar Energy (06 Periods, 14%)

Topics: Solar Map of India: Global solar power radiation; Different types of Solar water heaters: working and installation; Solar Heating systems, Different types of Solar cookers, Solar lighting.

Unit – II: Concentrated Solar Power (CSP) (08 Periods, 18%)

Topics: Concentrated Solar Power (CSP) plants or solar thermal electric systems; Parabolic Trough: working and specifications; Parabolic Dish: Construction, working and specifications; Power Tower, Fresnel Reflectors: Construction, working and specifications; Solar Stirling engines.

Unit – III: Solar PV Panel and Installation (10 Periods, 25%)

Topics: Types construction, working, Typical specifications of solar cells; Solar PV working principle: Series and parallel connections of solar modules; Solar Photovoltaic (PV) system: components layout and working, Solar modules, arrays and their standard specifications; Roof top and streetlight solar PV systems; Solar water pumping application.

Unit – IV: Solar PV Electronics (10 Periods, 25%)

Topics: Solar Charge controllers: working and specifications, switchgear and cables; Batteries: Different types for solar PV systems, Solar Inverters: working; Signal conditioning systems: working, Solar Power tracking: construction, working, I-V, P-V characteristics.

Unit – V: Solar PV Off-grid and Grid Tied Systems (08 Periods, 18%)

Topics: Solar off grid systems: Layout; Solar Grid tied (on grid) systems: Working principle of grid-tied dc-ac inverter, grid synchronization and active power export; Net metering: main features and working.

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Reference Books (as listed in the syllabus)

- Solanki, Chetan Singh, - Solar Photovoltaics: Fundamentals, Technologies and Applications, PHI Learning, New Delhi, ISBN: 9788120351110
- Kothari, D.P. et al: Renewable Energy Sources and Emerging Technologies, PHI
- David M. Buchla, Thomas E. Kissell, Thomas L. Floyd, - Renewable Energy Systems, Pearson Education New Delhi, ISBN: 9789332586826
- Rachel, Sthuthi, Earnest, Joshua; - Wind Power Technologies, PHI Learning
- O.P. Gupta, Energy Technology, Khanna Publishing House, ISBN: 978-93-86173-683

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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

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.2	Program Elective-3: Electric Traction	Theory	3 –	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%

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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.

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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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Energy Conservation and Audit — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.3 (Practicum) • Total 100 Marks • 4 Credits • L 2 – P 4

Note: In the PDF the unit headings give Unit III as 06 periods and Unit IV as 08 periods, but the Suggested Distribution of Marks table gives Unit III as 08 periods and Unit IV as 06 periods (total 28 either way). The unit headings are used here.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.3	Energy Conservation and Audit	Practicum	2 – 4	4	60	40 (3 hrs)	100
Energy Conservation and Audit Total				**4**	**60**	**40**	**100**

What This Subject Aims To Do

To help students undertake energy conservation and energy audit.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Energy Conservation	02	14%
II	Energy Conservation in Electrical Machines	06	24%

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III	Energy conservation in Electrical Installation systems	06	24%
IV	Energy conservation through Cogeneration and Tariff	08	24%
V	Energy Audit of Electrical System	06	14%

Unit – I: Energy Conservation (02 Periods, 14%)

Topics: Basics Energy Scenario: Primary and Secondary Energy, Energy demand and supply, National scenario; Energy conservation and Energy audit; concepts and difference; Indian Electricity Conservation Act 2001 and its latest amendments; relevant clauses of energy conservation; BEE and its Roles; Star Labelling: Need and its benefits.

Unit – II: Energy Conservation in Electrical Machines (06 Periods, 24%)

Topics: Need for energy conservation in induction motor and transformer; Energy conservation techniques in induction motor by: Improving Power quality, Motor survey, Matching motor with loading, Operating in star mode, Replacement by energy efficient motor; Energy conservation techniques in Transformer; Replacement by energy efficient transformers; Energy Conservation Equipment: Soft starters, Automatic star delta convertor, Variable Frequency Drives, Automatic p.f. controller (APFC), Intelligent p.f. controller (IPFC); Energy efficient motors: significant features, advantages, applications and limitations.

Unit – III: Energy conservation in Electrical Installation systems (06 Periods, 24%)

Topics: Energy Conservation in HVAC and Refrigeration System: Introduction, Concept of Energy Efficiency Ratio (EER), Energy saving opportunities in Heating, Ventilation and Air Conditioning (HVAC) and Refrigeration Systems; Energy Conservation in Lighting System: a) Replacing Lamp sources, b) Using energy efficient luminaries, c) Using light-controlled gears, d) Installation of separate transformer / servo stabilizer for lighting; Energy Conservation techniques in fans, electronic regulators.

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Unit – IV: Energy conservation through Cogeneration and Tariff (08 Periods, 24%)

Topics: Co-generation: concept, significance for energy conservation, Types of cogeneration basis of technology (Steam turbine cogeneration, Gas turbine cogeneration); Factors governing the selection of cogeneration system; Advantages of cogeneration; Tariff: Types of tariff structure, Transformers Tariff structure, Special tariffs; Time-off-day tariff, Peak-off-day tariff, Power factor tariff, Maximum Demand tariff, Load factor tariff; Application of tariff system to reduce energy bill; Concept of sanctioned load, maximum demand, contract demand and monthly minimum charges (MMC).

Unit – V: Energy Audit of Electrical System (06 Periods, 14%)

Topics: Energy audit (definition as per Energy Conservation Act); Energy audit instruments and their use; Questionnaire for energy audit projects; Energy flow diagram (Sankey diagram); Simple payback period, Energy Audit procedure (walk through audit and detailed audit); Energy Audit report format.

Practical Work

- Unit I — Identify star labelled electrical apparatus and compare the data for Three-star ratings.
- Unit I — Identify star labelled electrical apparatus and compare the data for Four-star ratings.
- Unit I — Identify star labelled electrical apparatus and compare the data for Five-star ratings.
- Unit II — Demonstrate that power factor of an induction motor load is improved by connecting capacitor bank.
- Unit II — Conduct a survey on installed motor and assess the matching of motor with its load. Determine the reduction in power consumption in star mode operation of Induction motor compared to delta mode.
- Unit II — Connect Soft starter with suitable rating Induction Motor and Observe its operation during starting and running. Also measure the current and power consumption.
- Unit III — To measure energy efficiency ratio (EER) of an air conditioner.
- Unit III — Compare power consumption of different types of Tube light with choke, electronic ballast and LED lamps by direct measurements.
- Unit III — Measure the Current, Power and Energy consumption of Modern BLDC Ceiling Fan.
- Unit III — Measure the Current, Power and Energy consumption of Ceiling Fan.
- Unit IV — Collect electricity bill of a commercial consumer and suggest suitable tariff for conservation and reduction of its energy bill.

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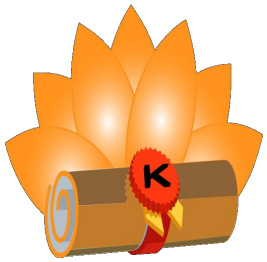
- Unit IV — Collect electricity bill of a residential consumer and suggest suitable means for conservation and reduction of the energy bill.
- Unit IV — Collect Electricity bills of typical residential or College service connections for the period of 1 year and prepare the bar chart of energy consumption and energy cost. Discuss the result.
- Unit V — Carrying out Mini Energy Audit of Institute's lab/classroom (lighting, fans and ACs) and preparation of sample energy audit report format.
- Unit V — Prepare a sample energy audit questionnaire for the given industrial facility.

Reference Books (as listed in the syllabus)

- Guidebooks No. 1 and 3 for National Certification Examination for Energy Managers and Energy Auditors, Bureau of Energy Efficiency (BEE), Bureau of Energy Efficiency (A Statutory body under Ministry of Power, Government of India) (Fourth Edition 2015)
- O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi
- Henderson, P. D., India - The Energy Sector, University Press, Delhi, 2016. ISBN: 978-0195606539
- Turner, W. C., Energy Management Handbook, Fairmount Press, 2012, ISBN 9781304520708
- Sharma, K. V., Venkataseshaiah; P., Energy Management and Conservation, I K International Publishing House Pvt. Ltd; 2011 ISBN 9789381141298
- Mehta, V. K., Principles of Power System, S. Chand & Co. New Delhi, 2016, ISBN 9788121905947
- Singh, Sanjeev; Rathore, Umesh, Energy Management, S K Kataria & Sons, New Delhi ISBN-13: 9789350141014
- Desai, B. G.; Rana, J. S.; A. Dinesh, V.; Paraman, R., Efficient Use and Management of Electricity in Industry, Devki Energy Consultancy Pvt. Ltd.
- Chakrabarti, Aman, Energy Engineering and Management, e-books Kindle Edition
- Dr. Vijay Mittal, Dr. T.D.Bisht, Anil Kumar Kukreja, Ravindra Patel, Asian Publishers, Muzaffarnagar, ISBN No. 978-93-91541-11-8

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Electrical Testing and Commissioning — Complete Syllabus (Program Elective-4, Option 1)

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.4.1 (Program Elective-4, Practicum) • Total 100 Marks • 3 Credits • L 1 – P 4 • Choose this OR Illumination Practices

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.4	Program Elective-4: Electrical Testing and Commissioning	Practicum	1 – 4	3	60	40 (3 hrs)	100
Electrical Testing and Commissioning Total				**3**	**60**	**40**	**100**

What This Subject Aims To Do

To help students follow standard safety procedures in testing and commissioning of electrical equipment.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Electrical Safety and Insulation	03	20%

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II	Installation & Erection Concept of foundation for installation of machinery	02	15%
III	Testing and Commissioning	03	20%
IV	Troubleshooting Plans	03	20%
V	Maintenance	03	25%

Unit – I: Electrical Safety and Insulation (03 Periods, 20%)

Topics: Do's and don'ts regarding safety in domestic electrical appliances as well for substation/ power station operators; Electrical safety in industry/power stations/ substations at the time of operation/ control/ maintenance; Fire detection alarm, fire-fighting equipment's, measuring insulation resistance by different methods such as i) Polarization, ii) Dielectric absorption, iii) Megger and to predict the condition of insulation; Reconditioning of insulation, insulating oil - properties of insulating oil, causes of deterioration of oil.

Unit – II: Installation & Erection Concept of foundation for installation of machinery (02 Periods, 15%)

Topics: Requirements of foundation for static and rotating electrical machinery; Concept of leveling and aligning; Procedure for leveling and aligning alignment of direct coupled drive, effects of mis-alignment; Installation of transformer and procedure of installation of transformer, Requirements of installation of pole mounted transformer; Devices and tools required for loading, unloading, lifting, and carrying heavy equipment and precautions to be taken while handling them.

Unit – III: Testing and Commissioning (03 Periods, 20%)

Topics: Concept of testing and Objective of testing; Roles of I.S.S. in testing of electrical equipment, Types of tests and concepts: Routine tests, supplementary test, special tests, Methods of testing - Direct/Indirect/Regenerative testing; Tolerances for the various items for equipment – transformer, induction motor, dc motor, synchronous machines; Commissioning, Tests before Commissioning for transformer, induction motor, alternator; Testing of three-phase Induction motor as per I.S.325; Testing of single-phase induction motor; Testing of synchronous machines and D.C. machines.

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Unit – IV: Troubleshooting Plans (03 Periods, 20%)

Topics: Internal and external causes for failure / abnormal operation of equipment; List of mechanical faults, electrical faults and magnetic faults in the electrical equipment remedies, applications; Use of tools like bearing puller filler gauges, dial indicator; Common troubles in electrical equipments and machines; Preparation of trouble shooting charts for D.C. Machines, AC Machines and transformers.

Unit – V: Maintenance (03 Periods, 25%)

Topics: Concept of maintenance, types of maintenance, Routine, preventive and breakdown maintenance; Causes of failure of electrical machines; Preventive maintenance - procedure or developing maintenance schedules for electrical machines; Factors affecting preventive maintenance schedule: (a) Distribution transformer, (b) Single phase and three phase Induction motors, (c) Batteries.

Practical Work

- Unit I — Determine breakdown strength of transformer oil.
- Unit I — Perform insulation resistance test on any one motor/transformer using Megger.
- Unit II — Evaluating the parts of an alternator and testing an assembled alternator same on a test bench for proper operation.
- Unit II — Evaluating the parts of a Transformer assembled Transformer same on a test bench for proper operation.
- Unit III — Find regulation and efficiency of single phase transformer by direct loading and back-to-back connection method and compare the results.
- Unit III — Determine efficiency of D.C. machine by Swinburne's test.
- Unit III — Determine efficiency of D.C. machine by Hopkinson's test.
- Unit IV — Prepare trouble shooting charts for electrical machines such as Transformer, D.C. machines, Induction motor, and Synchronous machines.
- Unit IV — Use of tools like bearing puller, filler gauges, dial indicator.
- Unit V — Prepare the preventive maintenance schedule of Distribution transformer.
- Unit V — Prepare the preventive maintenance schedule of induction motor.
- Unit V — Prepare the preventive maintenance schedule of batteries.

Reference Books (as listed in the syllabus)

- Deshpande, M. V. PHI Learning Pvt. Ltd., 2010, Design and Testing of Electrical Machines ISBN No 8120336453, 9788120336452
- Rao, B V S Asia Club House, First Reprint, 2011, Operation and Maintenance of Electrical Equipment Vol-I, ISBN No 8185099022

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- Rosenberg. Mc GRAW-HILL, 1st Edition, May 2003, Maintenance and Repairs, ISBN No 9780071396035
- Sharotri, S.K. Glencoe/ Mcgraw-Hill; 2nd Edition, June 1969; Preventive Maintenance of Electrical Apparatus, ISBN No 10: 007030839X 13: 978-0070308398



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Illumination Practices — Complete Syllabus (Program Elective-4, Option 2)

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.4.2 (Program Elective-4, Practicum) • Total 100 Marks • 3 Credits • L 1 – P 4 • Choose this OR Electrical Testing and Commissioning

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Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.4	Program Elective-4: Illumination Practices	Practicum	1 - 4	3	60	40 (3 hrs)	100
Illumination Practices Total					**60**	**40**	**100**

What This Subject Aims To Do

To help students design illumination schemes and the associated electrification of buildings.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Fundamentals of illumination	2	18%
II	Types of lamps	3	22%
III	Illumination Control and Control Circuits	4	22%
IV	Illumination for Interior Applications	2	16%

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V	Illumination for Other Applications	3	22%

Unit – I: Fundamentals of illumination (2 Periods, 18%)

Topics: Basic illumination, Terminology, Laws of illumination, Concept of Photometry, Measurement of illumination; Lighting calculation methods, Watt / m2 method, Lumens or light flux method, Point to point method.

Unit – II: Types of lamps (3 Periods, 22%)

Topics: Incandescent lamp, ARC lamps – AC and DC arc lamps, fluorescent lamp; Types of other lamps: Mercury vapour lamp, HPMV lamp, Mercury iodide lamp, Sodium vapour lamp, Halogen Lamps, Ultraviolet Lamps, Neon Lamps; Neon Sign Tubes; Metal halides, HID and Arc lamps, LED lamps, CFL.

Unit – III: Illumination Control and Control Circuits (4 Periods, 22%)

Topics: Purpose of lighting control and Dimmer, Dimmer Transformer, Auto transformer dimmer, Two winding transformer dimmer; Electronic Dimmer: working principle and operation: 1. Thyristor operated dimmer, 2. Triac operated dimmer; Control of Enhance Lighting, Methods used for light control; Control circuits for lamps: ON/OFF control; Control circuits for lamps: single lamp controlled by single switch, two switches.

Unit – IV: Illumination for Interior Applications (2 Periods, 16%)

Topics: Standard for various locations of Interior illumination; Design considerations for Interior location of residence premises (1/2 BHK); Illumination scheme for different Interior locations of Commercial, industrial unit.

Unit – V: Illumination for Other Applications (3 Periods, 22%)

Topics: Factory Lighting, Street Lighting (Latest Technology), Flood Lighting, Railway Lighting; Brief idea: Lighting for advertisement / Hoardings / sports lighting, Agriculture and Horticulture lighting, Health Care Centers / Hospitals, Decorating Purposes, Stage Lighting, Aquariums and Ship-yards.

Practical Work

- Unit I — Conduct illumination level assessment in workplace using lux meter.
- Unit I — Measure illumination level with and without reflectors used in the various Luminaries.

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- Unit II — Fit the given lamp in the selected mounting.
- Unit II — Estimate and compare luminous efficiency of incandescent and compact fluorescent lamp.
- Unit III — Prepare light dimmer arrangement using the relevant dimmer type of transformer.
- Unit III — Build an electronic dimmer – Part I.
- Unit III — Build another type of electronic dimmer – Part II.
- Unit IV — Measure the illumination output of different lamps (Incandescent, Fluorescent, CFL, LED, HPSV, HPMV) and compare it with their wattage.
- Unit V — Build a single lamp control by single switch.
- Unit V — Build a single lamp control by two switches.

Reference Books (as listed in the syllabus)

- Lindsey, Jack L., Applied Illumination Engineering, The Fairmont Press Inc.
- Simons, R. H., Bean, Robert; Lighting Engineering: Applied Calculations, Architectural Press. ISBN: 0750650516
- Casimer M Decusatis, Handbook of Applied Photometry, Springer, ISBN 1563964163
- Butterworths, Lyons Stanley, Handbook of Industrial Lighting, Butterworths
- Simpson Robert S, Lighting Control Technology and Applications, Focal Press
- Kao Chen, Energy Management in Illuminating Systems, CRC Press

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.O.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.

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Indian Constitution — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27
Subject 5.5 (Audit Course) (Q) • 50 Marks internal • 0 Credits • L 2 – P 0 • Qualifying only

About this document: This is an audit course marked (Q) — compulsory to appear and pass, but marks are not included for percentage and division.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.5	Indian Constitution (Q)	Audit Course	2 – 0	—	50	—	N/A
Indian Constitution Total				**–**	**50**	**—**	**N/A**

What This Subject Aims To Do

To provide a comprehensive understanding of the Indian Constitution's history and philosophy, and to familiarise students with the administrative structure, powers and functions of the Union, State and Local governments, along with the Judiciary and Election Commission.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	The Constitution – Introduction	6	20%
II	Union Government	6	20%
III	Indian Legislature & Judiciary	6	20%

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IV	State Government	3	12%
V	Local Administration	4	16%
VI	Election Commission	3	12%

Unit – I: The Constitution – Introduction (06 Periods, 20%)

Topics: The History of the Making of the Indian Constitution; Preamble and the Basic Structure, and its interpretation; Fundamental Rights and Duties and their interpretation.

Unit – II: Union Government (06 Periods, 20%)

Topics: Structure of the Indian Union Government; President – Election, Role and Power; Prime Minister and Council of Ministers.

Unit – III: Indian Legislature & Judiciary (06 Periods, 20%)

Topics: Composition of Lok Sabha and Rajya Sabha; Powers & Functions of Lok Sabha and Rajya Sabha; Structure of Supreme Court including Appointment of Judges; Powers & Functions of Supreme Court.

Unit – IV: State Government (03 Periods, 12%)

Topics: Governor – Role and Power; Chief Minister and Council of Ministers; State Secretariat.

Unit – V: Local Administration (04 Periods, 16%)

Topics: District Administration; Municipal Corporation; Zila Panchayat.

Unit – VI: Election Commission (03 Periods, 12%)

Topics: Structure of Election Commission of India; Role and Function of Election Commission.

Reference Books (as listed in the syllabus)

- Ethics and Politics of the Indian Constitution Rajeev Bhargava Oxford University Press, New Delhi, 2008
- The Constitution of India B.L. Fadia Sahitya Bhawan; New edition (2017)
- Introduction to the Constitution of India DD Basu Lexis Nexis; Twenty-Third 2018 edition

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- Our Constitution Subhash Chand Kashyap NBT New Delhi



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Electrical Estimation and Contracting — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.6 (Practicum) • Total 100 Marks • 4 Credits • L 2 – P 4

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.6	Electrical Estimation and Contracting	Practicum	2 – 4	4	60	40 (3 hrs)	100
Electrical Estimation and Contracting Total				**4**	**60**	**40**	**100**

What This Subject Aims To Do

To help students design electrical installations with costing for tendering.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Electric Installation and Safety	04	15%
II	Estimation and Costing	08	30%
III	Non-Industrial Installations	06	20%
IV	Industrial Installation	04	15%
V	Distribution Lines and LT Substation	06	20%

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Unit – I: Electric Installation and Safety (04 Periods, 15%)

Topics: Scope and features of National electric code 2023; Types of electrical installation; Fundamental principles for electrical installation; Permit to work, safety instructions and safety practices; Purpose of estimating and costing.

Unit – II: Estimation and Costing (08 Periods, 30%)

Topics: Meaning and purpose of - rough estimate, detailed estimate, supplementary estimate, annual maintenance estimate and revised estimate; Factors to be considered while preparation of detailed estimate and economical execution of work; Contracts - Concepts of contracts, types of contracts, contractor, role of contractor; Tenders and Quotations - Type of tender, tender notice, preparation of tender document, and method of opening of tender; Quotation, quotation format, comparison between tender and quotation; Comparative statement, format comparative statement; Order format, placing of purchasing order; Principles of execution of works, planning, organizing and completion of work, Billing of work.

Unit – III: Non-Industrial Installations (06 Periods, 20%)

Topics: Types of non-industrial installations - Office buildings, shopping and commercial centre, residential installation, Electric service and supply; Design consideration of electrical installation in commercial buildings; Design procedure of installation - steps involved in detail, Estimating and costing of unit, Earthing of commercial installation; Design electrical installation scheme of commercial complex.

Unit – IV: Industrial Installation (04 Periods, 15%)

Topics: Classification of industrial buildings; Classification based on power consumption; Drawing of wiring diagram and single line diagram for single phase and three phase Motors; Design consideration in industrial installations; Design procedure of installation - detailed steps; Design electrical installation scheme of factory/ small industrial unit, Preparation of material schedule and detailed estimation; Installation and estimation of agricultural pump and flourmill.

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Unit – V: Distribution Lines and LT Substation (06 Periods, 20%)

Topics: Introduction to overhead and underground distribution line; Materials used for distribution line HT and LV; Cables used for distribution line, factors determining selection of LT/ HT power Cables, cable laying and cable termination method according to IS; Design, estimation and costing of HT LT overhead line and underground cabling; Estimation of load, Load factor, diversity factor and determination of rating of distribution Transformer; Design, estimation and costing of outdoor and indoor 11 KV substation.

Practical Work

- Unit I — To understand the objective of safety in Electric installation.
- Unit I — List out all the personal protective equipment's PPE's available in industry.
- Unit I — Prepare an estimate of institute/College for electrical connection and costing of equipment's used.
- Unit II — Prepare a tender notice for purchasing a transformer of 100 KVA for commercial installation.
- Unit II — Prepare a quotation for purchasing different electrical material required.
- Unit II — Prepare a comparative statement for above material. Prepare purchase order for the same.
- Unit II — Estimate with a proposal of the Electrical Installation of streetlight scheme for small premises after designing.
- Unit II — Estimate with a proposal of the L.T. line installation. Prepare report and draw sheet.
- Unit III — Prepare Electrical Estimation for Residential and Industrial wirings.
- Unit III — Design drawing, estimating and costing of hall / cinema theatre / commercial installation. Prepare report and draw sheet.
- Unit IV — Design electrical installation scheme for any one factory / small industrial unit. Draw detailed wiring diagram. Prepare material schedule and detailed estimate. Prepare report and draw sheet.
- Unit IV — To plan multiple earthing system for industrial installation.
- Unit IV — To measure the earth resistance of various equipment installed in institute/ college.
- Unit IV — List out the various bus schemes in substation.
- Unit V — Estimate with a proposal of the electrical Installation of streetlight scheme for small premises after designing.
- Unit V — Estimate with a proposal of the L.T. line installation. Prepare report and draw sheet.
- Unit V — Estimate with a proposal of the 500 KVA, 11/0.433 KV outdoor substation and prepare a report.

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- Unit V — Identify indoor and outdoor switch gear system.

Reference Books (as listed in the syllabus)

- Raina, K.B.; Dr. S. K. Bhattacharya New Age International Publisher First, Reprint 2010, Electrical Design Estimating and Costing ISBN: 978-81-224-0363-3
- Allagappan, N. S. Ekambarram, Tata Mc-Graw Hill Publishing Co. Ltd, Electrical Estimating and Costing, ISBN 13: 9780074624784
- Singh, Surjit Ravi Deep Singh, Dhanpat Rai and Sons, Electrical Estimating and Costing, ISBN13: 1234567150995
- Gupta, J.B. S.K. Kataria and Sons Reprint Edition, A Course in Electrical Installation Estimating and Costing ISBN 10: 9350142791 13: 978-9350142790
- Bureau of Indian Standard. IS: 732-1989, Code of Practice for Electrical Wiring Installation
- Bureau of Indian Standard. SP-30:2011, National Electrical Code 2011
- Dr. T. D. Bisht, Ashish Sahoo, Dinesh Kumar Gautam, Electrical Design, Drawing & Estimating -I, ISBN No. 978-93-5502-015-4
- Dr. T. D. Bisht, Ashish Sahoo, Electrical Design, Drawing & Estimating -II, ISBN No. 978-93-5502-194-6

Source: BTEUP 3rd Year curriculum (folder26_7), 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.

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Summer Internship-II & Student Centred Activities — 5th Semester

BTEUP Diploma in Electrical Engineering • 5th Semester • Session 2026–27

Subject 5.7 (Internship) 100 Marks • SCA 50 Marks • Total 150 Marks • 2 Credits

About this document: Summer Internship-II is the 6-week industrial training done after the 4th-semester examinations, during the summer vacation. It is evaluated in the 5th semester. The PDF gives no separate detailed internship syllabus — only the scheme row and the notes below.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.7	Summer Internship (6 Weeks)	Internship	—	2	60	40 (3 hrs)	100
#	Student Centred Activities (SCA)	Activity	0 – 10	—	50	—	50
Internship-II + SCA Total				**2**	**110**	**40**	**150**

Summer Internship-II — What It Is

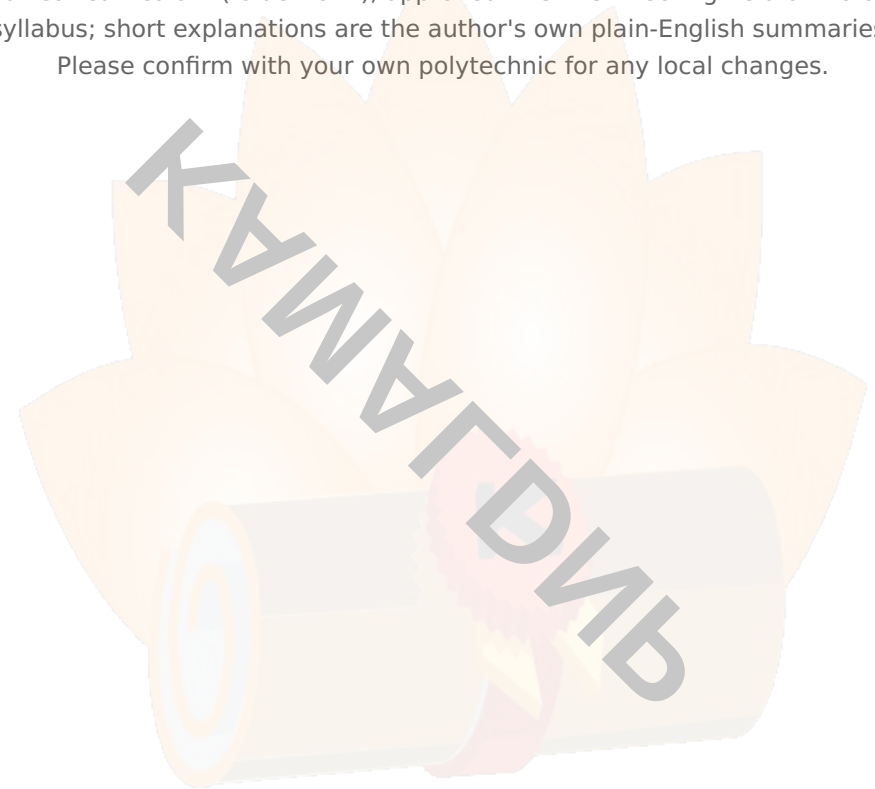
Six weeks of industrial training, mandatory after the IV semester during the summer vacation (total marks allotted to industrial training after II and IV semesters are respectively 50 & 100). Students present a seminar/viva on their summer internship along with certificate, project and report.

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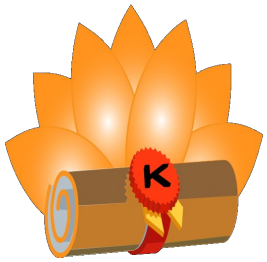
Student Centred Activities (SCA) — 50 Marks

A provision for overall personality development, including co-curricular activities such as extension lectures, games, hobby clubs (e.g. photography), seminars, declamation contests, educational field visits, N.C.C., NSS, library, cultural activities and self-study. Marks distribution: 15 marks general behaviour and discipline; 10 marks attendance (75–80% = 6, 80–85% = 8, above 85% = 10); odd-semester activities (25 marks maximum): Language Lab Practices / foreign language practices, Group Discussion and Personality Development, Industrial Visits/Industrial Talks, Power Point Presentations and Resume Making, Development of Aptitude and Reasoning Skills, participation in technical exhibitions, symposiums, seminars, workshops at institute/district/state/national level.

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.



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6th Semester — Complete Examination Scheme (Normal Pathway)

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Semester total 650 Marks • 20 Credits • (Q) = qualifying only, marks not counted for percentage/division • An Industrial Pathway is also offered (see below)

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About this document: The full 6th semester study and evaluation scheme (normal pathway) as printed in the curriculum. (Q) subjects are compulsory to appear and pass, but their marks are not included for percentage and division. The 6th semester is also offered as an Industrial Pathway (one semester of industrial training/internship, optional along with usual classroom training).

Examination Scheme

Code	Paper	Type	L – P	Credit	Internal	External	Total
6.1	Building Electrification	Practicum	2 – 4	4	60	40 (3 hrs)	100
6.2	Entrepreneurship and Start-Ups	Theory	2 – 0	2	40	60 (3 hrs)	100
6.3	In-House Project	Project	4 – 16	12	240	160	400
6.4	Advance Skill Development (Open Elective-3) (Q)	Theory	2 – 0	2	50	—	N/A
#	Student Centred Activities (SCA)	Activity	0 – 6	—	50	—	50

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6th Semester Total (Normal Pathway)	**20**	**390**	**260**	**650**

Open Elective-3 (6.4) — Options

Theory courses (choose one): (1) Project Management; (2) Internet of Things.
Certification courses (choose one, not less than 20 hrs, offline/online, from agencies of repute): courses conducted by Centre of Excellence (e.g. Tata Technologies — see Annexure 1), Infosys Springboard, TCS iON, other relevant government / international / national organisations or platforms of repute, AICTE-ELIS and Centrally Funded Technical Institutes, C-DAC, NIELIT.

6th Semester — Industrial Pathway (alternative to the normal pathway)

The industrial training tenure should not be less than 14 weeks. The industry must be registered with MSME / Directorate of Industries / Limited Organization / State / Central Government establishments. Monthly progress reports of the intern/trainee should be attested and forwarded by the industrial supervisor during the internship/training. The institute deputes one faculty member as mentor for at least 20–30 students. “Entrepreneurship and Start-up” is also mandatory in industrial internship/training mode, conducted online by the polytechnic; after completing the online course, students must appear for the exam conducted by the Board of Technical Education, Lucknow.

Code	Subject	Credits	Internal	External	Total
6.1	Entrepreneurship and Start-Ups (Online Mode)	2	100	—	100
6.2	Industrial Hands-on Practice	12	150 (faculty mentor)	200 (industry)	350
6.3	Industrial Project	4	50 (faculty mentor)	50 (industry)	100
6.4	Seminar	2	100	—	100
	Total	**20**			**650**

Industrial Hands-on Practice, Industrial Project and seminar are evaluated on the basis of the AICTE Internship Policy: Guidelines and procedures (Chapter 9). The seminar is evaluated through a seminar presentation / viva-voce at the institute, based on the training report, before an expert committee constituted by the concerned department.

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Student Centred Activities (SCA) — 50 Marks

Co-curricular activities like extension lectures, games, hobby clubs (e.g. photography), seminars, declamation contests, educational field visits, N.C.C., NSS, library, cultural activities and self-study. Marks distribution: 15 marks general behaviour and discipline; 10 marks attendance (75–80% = 6, 80–85% = 8, above 85% = 10); even-semester activities (25 marks maximum): Sports/NCC/Cultural/Co-curricular/NSS activities (State/National level participation, participation in two of the above activities, Inter-Polytechnic level participation).

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.

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Building Electrification — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Subject 6.1 (Practicum) • Total 100 Marks • 4 Credits • L 2 – P 4

Note: In the PDF the unit headings give 04/06/06/08/04 periods (total 28), but the Suggested Distribution of Marks table gives 11/11/11/13/10 periods (total 56). The unit headings are used here; the marks-table periods look copied from a theory subject.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
6.1	Building Electrification	Practicum	2 – 4		60	40 (3 hrs)	100
Building Electrification Total				**4**	**60**	**40**	**100**

What This Subject Aims To Do

To help students design electrical installation systems in building complexes.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Wiring Tools and Accessories	04	20%
II	Electrical Wires and Underground Cables	06	20%
III	Wiring Methods and wiring layout	06	20%
IV	Residential Building Electrification	08	23%

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V	Protective Devices and Earthing for Electrical Installation	04	17%

Unit – I: Wiring Tools and Accessories (04 Periods, 20%)

Topics: Various tools required for wiring; Application, care & maintenance of tools: Screwdrivers, pliers, Try square, saws, hacksaw, chisel, hammers, mallet, rawal punch, hand drill machine, portable drilling machine, files, plumb bob, line thread, electricians' knife, test lamp, tester; Switch – Their types according to construction such as surface switch, flush switch, and pull switch, rotary switch, knife switch, pendent switch, Main-switch (ICDP, ICTP); Their types according to working such as single pole, double pole, two-way, two-way centre off, intermediate, series parallel switch; Holders - Their types such as bayonet cap lamp holder, pendent holder, batten lamp holder, angle holder, bracket holder, tube light holder, screw type Edison and goliath Edison lamp holder, swivel lamp holder; Socket outlets and plugs - two pin, three-pin, multi pin sockets, two-pin and three-pin plug; Others - Iron connector, adaptor, and ceiling rose, distribution box, neutral link, bus-bar chamber; Wooden/ mica boards, Moulded/ MS Concealed boxes of different sizes; Modular accessories; BIS symbols of various electrical accessories.

Unit – II: Electrical Wires and Underground Cables (06 Periods, 20%)

Topics: Conductors: Wire, cable, bus bar, stranded conductor, cable, armoured cable, flexible cable, solid conductor, PVC wires, CTS wire, LC wire, FR (Fire retardant) wire; Tools used for measurement of wire size, Wire jointing methods; Classification of cables, low tension, high tension, and extra high-tension cables, solid, oil filled and gas filled type; Cable insulation materials – Polyvinyl chloride (PVC), cross linked polythene (XLPE); Selection of suitable cable size and type from standard data; Cable jointing methods; Cable laying methods; Factors determining selection of electric cables.

Unit – III: Wiring Methods and wiring layout (06 Periods, 20%)

Topics: Factors determining the selection of wiring methods; Classification of wiring methods; PVC casing-capping wiring - wiring rules according to IS: 732-2019; Conduit wiring - Types of conduit, types of conduit wiring (Surface/Concealed); Conduit wiring accessories; Comparison of various wiring systems; General BIS rules for domestic installations; Design, working and drawing of following electrical circuits: Simple light and fan circuits, Staircase wiring, Go-down wiring circuit, Bedroom lighting circuit, Corridor lighting circuit, Series parallel circuit, Master switch control circuit, Different lighting circuit using - Intermediate switch, Call bell circuit using bell indicator, Design of wiring circuits according to user's requirement.

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Unit – IV: Residential Building Electrification (08 Periods, 23%)

Topics: Domestic Dwellings/Residential Buildings: Reading of Civil Engineering building drawing, Interpretation of electrical installation plan and electrical diagrams, electrical symbols as per IS: 732:2019; Electrical installation for residential building as per NEC 2023; Difference between residential and industrial load, rules/requirements related to lighting load followed in electrical installations, Positioning of equipment; Lighting and power circuits: Light and fan circuit, Power circuit wiring and circuit Schematic diagram according to IS: 2042(Part-I)-1962: multiline and single line representation; Load assessment: Selection of size of conductors, Selection of rating of main switch and protective switch gear; Design and drawing, estimation and costing of a residential installation having maximum 5 KW load; Sequence to be followed for preparing estimate; Calculation of length of wire and other materials, labour cost; Testing of wiring installation as per IS: 732-2019: Insulation resistance - between earth and conductors, between conductors, polarity test of single pole switches; Testing of earth continuity path; Residential building Service Connection - types Underground and overhead; Calculation of Material required for service connection.

Unit – V: Protective Devices and Earthing for Electrical Installation (04 Periods, 17%)

Topics: Miniature circuit Breaker (MCB), Construction, Principle, rating and uses; MCCB - Construction, Principal rating and uses; Earth Leakage Circuit Breaker (ELCB) - Construction, Principle, rating and uses; Residual Current Circuit Breaker (RCCB) - Construction, Principle rating and uses; System and equipment earthing and its requirements, Measurement of earth resistance using earth tester, Methods of reducing earth resistance, Methods of earthing and their procedure - Driven pipe, pipe and plate earthing, modern methods of earthing.

Practical Work

- Unit I — Prepare the chart of electrical accessories with their symbols.
- Unit II — Select the electric wire using measuring and testing instruments for particular applications.
- Unit II — Identify cables of different current ratings.
- Unit III — Prepare wiring installation on a board showing control of one lamp, one fan and one socket from one switch board in PVC surface conduit wiring system.
- Unit III — Control one lamp from two different places using PVC surface conduit wiring system.
- Unit III — Prepare wiring installation on a board. Control one lamp from three different places using PVC surface conduit wiring system.

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- Unit IV — Design 2 BHK residential installation scheme and estimate the material required. And draw the details required for installation on A4 size sheet.
- Unit IV — Perform go-down wiring for three blocks using PVC casing capping.
- Unit IV — Test wiring installation using megger.
- Unit V — Measurement of Earth Resistance by using Earth tester.
- Unit V — Dismantling of MCB and identify various parts.

Reference Books (as listed in the syllabus)

- Raina, K.B. and S.K. Bhattacharya, Electrical Design Estimating and Costing, New Age International Ltd., New Delhi, ISBN 978-81-224-0363-3
- Allagappan, N., S. Ekambarram, Electrical Estimating and Costing, New Delhi, ISBN-13: 9780074624784
- Singh, Surjit, Electrical Estimating and Costing, Dhanpat Rai and Co. New Delhi, ISBN: 1234567150995
- Gupta, J B: A Course in Electrical Installation Estimating and Costing, S K Kataria and Sons, New Delhi, ISBN: 978-93-5014-279-0
- Bureau of Indian Standard, IS: 732-2019, Code of practice for electrical wiring installation
- Bureau of Indian Standard, SP 30 National Electrical Code 2023
- Bureau of Indian Standard, SP 72 National Lighting Codes 2010

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Entrepreneurship and Start-Ups — Complete Syllabus

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Subject 6.2 (Theory) • Total 100 Marks • 2 Credits • L 2 – P 0 • In the Industrial Pathway this subject is taken online (see 6th-semester scheme)

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
6.2	Entrepreneurship and Start-Ups	Theory	2 –	2	40	60 (3 hrs)	100
Entrepreneurship and Start-Ups Total					**40**	**60**	**100**

What This Subject Aims To Do

To foster an entrepreneurial mindset by equipping students with the skills to identify business opportunities, formulate comprehensive business plans, understand management functions, and navigate the financial and legal landscapes of starting and sustaining a venture.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Introduction to Entrepreneurship and Start – Ups	05	15%
II	Business Ideas and their implementation	04	15%
III	Ideas to Start-up	08	25%

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IV	Management	06	20%
V	Financing and Protection of Ideas	03	10%
VI	Succession, Dissolution and Harvesting strategy	02	15%

Unit – I: Introduction to Entrepreneurship and Start – Ups (05 Periods, 15%)

Topics: Definitions, Classification of Entrepreneur; Traits of an Entrepreneur, Intrapreneurship, Motivation; Types of Business Structures - On the Basis of size and on the basis of ownership; Similarities/differences between entrepreneurs and managers.

Unit – II: Business Ideas and their implementation (04 Periods, 15%)

Topics: Discovering ideas and visualizing the business; Activity map; Business Plan (Case Study).

Unit – III: Ideas to Start-up (08 Periods, 25%)

Topics: Marketing and Accounting – Definition and Importance; Market Analysis – STP (Segmentation, Targeting, Positioning), Competition evaluation and Strategy Development – Vision, Mission, Goal, Objectives; Risk analysis - SWOT Analysis.

Unit – IV: Management (06 Periods, 20%)

Topics: Definition Concept and Functions of Management, Company's Organization Structure - Concept and Classification; Recruitment and Selection - Definition, Training and Development - Importance.

Unit – V: Financing and Protection of Ideas (03 Periods, 10%)

Topics: Financing methods available for Entrepreneurship/ Startups in India (Government Scheme, Banking, NBFCs, SHG and Micro Financing); Intellectual Property Rights - Overview of - Copyrights, Trademark, Geographical Indicators, Patenting and Licenses; Communication of Ideas to potential investors – Investor Pitch.

Unit – VI: Succession, Dissolution and Harvesting strategy (02 Periods, 15%)

Topics: Ways of succession; Types of Dissolution.

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Reference Books (as listed in the syllabus)

- The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company – Steve Blank and Bob Dorf, K & S Ranch, ISBN: 978-0984999392
- Entrepreneurship Development (A New Venture Creation) – Vasant Desai, Himalaya Publishing House
- Entrepreneurship Development – S.S. Khanka, S. Chand & Company Ltd., New Delhi
- Entrepreneurship Development – Gupta and Srinivasan, S. Chand & Company Ltd., New Delhi
- Demand: Creating What People Love Before They Know They Want It – Adrian J. Slywotzky with Karl Weber, Headline Book Publishing, ISBN: 978-0755388974
- The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses – Eric Ries, Penguin UK, ISBN: 978-0670921607
- The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business – Clayton M. Christensen, Harvard Business Review Press, ISBN: 978-1422196021

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In-House Project — 6th Semester

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Subject 6.3 (Project) • Total 400 Marks • 12 Credits • L 4 – P 16

About this document — The PDF gives the scheme row for the In-House Project (6.3) but contains NO detailed syllabus section for it — no units, practicals or books are listed anywhere in the curriculum. Only the scheme figures below are from the PDF. In the Industrial Pathway this is replaced by Industrial Hands-on Practice + Industrial Project + Seminar (see the 6th-semester scheme).

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
6.3	In-House Project	Project	4 – 16	12	240	160	400
In-House Project Total				**12**	**240**	**160**	**400**

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Project Management — Complete Syllabus (Open Elective-3, Option 1)

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Subject 6.4.1 (Open Elective-3, Theory) (Q) • 50 Marks internal • 2 Credits • L 2 – P 0 • Choose this OR Internet of Things • Qualifying only

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About this document: Open Elective-3 (6.4) is a (Q) qualifying subject — compulsory to appear and pass, but marks are not included for percentage and division. Choose either this theory course or Internet of Things, or a certification course (not less than 20 hrs) from the approved providers.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
6.4	Project Management (Open Elective-3)	Theory (Q)	2 – 0	2	50	—	N/A
Open Elective-3 Total				**2**	**50**	**—**	**N/A**

What This Subject Aims To Do

To help students develop the idea of a project plan — from defining and confirming the project goals and objectives, to identifying tasks and how goals will be achieved.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share

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I	Concept of a project	04	18%
II	Capital budgeting process	06	22%
III	Financial estimates and projections	06	20%
IV	Basic techniques in capital budgeting	06	20%
V	Project administration	06	20%

UNIT-I: Concept of a project (04 Periods, 18%)

Topics: Classification of projects - importance of project management - The project life cycle - establishing project priorities (scope-cost-time) project priority matrix - work break down structure.

UNIT-II: Capital budgeting process (06 Periods, 22%)

Topics: Planning - Analysis - Selection - Financing - Implementation - Review; Generation and screening of project ideas - market and demand analysis - Demand forecasting techniques; Market planning and marketing research process - Technical analysis.

UNIT-III: Financial estimates and projections (06 Periods, 20%)

Topics: Cost of projects - means of financing - estimates of sales and production - cost of production - working capital requirement and its financing - profitability, projected cash flow statement and balance sheet; Break even analysis

UNIT-IV: Basic techniques in capital budgeting (06 Periods, 20%)

Topics: Non discounting and discounting methods - payback period - Accounting rate of return - net present value - Benefit cost ratio - internal rate of return; Project risk; Social cost benefit analysis and economic rate of return; Non-financial justification of projects.

UNIT-V: Project administration (06 Periods, 20%)

Topics: Progress payments, expenditure planning, project scheduling and network planning, use of Critical Path Method (CPM), schedule of payments and physical progress, time-cost trade off; Concepts and uses of PERT cost as a function of time, Project Evaluation and Review Techniques/cost mechanisms; Determination of least cost duration; Post project evaluation; Introduction to various Project management software.

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Reference Books (as listed in the syllabus)

- Project planning, analysis, selection, implementation and review – Prasannachandra – Tata McGraw Hill
- Project Management – the Managerial Process – Clifford F. Gray & Erik W. Larson – McGraw Hill
- Project management - David I Cleland - Mcgraw Hill International Edition, 1999
- Project Management – Gopala krishnan – Mcmillan India Ltd.
- Project Management - Harry - Maylor - Peason Publication

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Internet of Things — Complete Syllabus (Open Elective-3, Option 2)

BTEUP Diploma in Electrical Engineering • 6th Semester • Session 2026–27

Subject 6.4.2 (Open Elective-3, Theory) (Q) • 50 Marks internal • 2 Credits • L 2 – P 0 • Choose this OR Project Management • Qualifying only

About this document: Open Elective-3 (6.4) is a (Q) qualifying subject — compulsory to appear and pass, but marks are not included for percentage and division. Choose either this theory course or Project Management or a certification course (not less than 20 hrs) from the approved providers.

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Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
6.4	Internet of Things (Open Elective-3)	Theory (Q)	2 – 0	2	50	—	N/A
Open Elective-3 Total				**2**	**50**	**—**	**N/A**

What This Subject Aims To Do

To provide foundational knowledge of the Internet of Things — its architecture, components, networking, data handling and real-world applications — enabling students to understand and contribute to IoT systems across domains.

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Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
I	Introduction to Internet of Things	05	20%
II	Design consideration of IoT	05	20%
III	Interfacing by IoT devices	07	22%
IV	Data Handling and IoT Platforms	07	22%
V	Applications, Projects and Future of IoT	04	16%

Unit I - Introduction to Internet of Things (05 periods, 20%)

Topics: Basic Definition of “Internet of Things (IoT)”; Evolution and history of IoT; Technological trends enabling IoT: ubiquitous computing, cloud computing, low-cost sensors, wireless communication; IoT architecture overview: perception, network, and application layers; Impact of IoT on society: smart cities, healthcare, agriculture, transportation, and home automation; Challenges in IoT: privacy, security, scalability.

Unit II - Design consideration of IoT (05 Periods, 20%)

Topics: Overview of embedded system in IoT; Components of an embedded system: microcontroller, sensors, actuators, memory, power supply; Interactions of embedded systems with the physical world; Introduction to core hardware components and software tools most commonly used in IoT devices.

Unit III Interfacing by IoT devices (07 Periods, 22%)

Topics: Interaction between software and hardware in an IoT device; IoT networking basics: IP addressing, MAC, DNS, DHCP; Basic networking hardware: routers, switches, access points, gateways; Introduction to Structure of the Internet: client-server and peer-to-peer models; Overview of Wireless communication protocols: Wi-Fi, Bluetooth, ZigBee, LoRa, NB-IoT; Brief introduction to Cloud connectivity and MQTT/HTTP protocols.

Unit IV: Data Handling and IoT Platforms (07 Periods, 22%)

Topics: Role of data in IoT: sensing, logging, analysis, and actuation; Data acquisition and storage methods (local and cloud-based); Introduction to data analytics in IoT: basic visualization, dashboards; Overview of popular IoT platforms: ThingSpeak, Blynk, Google Firebase, AWS IoT; Real-time data monitoring and alerts; Security concerns and basic protection mechanisms (encryption, authentication, firewalls).

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Unit V: Applications, Projects and Future of IoT (04 Periods, 16%)

Topics: Overview of Application domains: Smart home, Industrial IoT, Healthcare, Smart farming; Mini project ideas: Smart temperature logger, IoT-based light control, Air quality monitor; Social, ethical, and environmental implications of IoT; Career prospects and skills in IoT; Trends and future scope of IoT: AIoT, 5G, Edge Computing.

Reference Books (as listed in the syllabus)

- "Internet of Things" by Jeeva Jose – Beginner-friendly, suitable for diploma students, covers basics to applications
- "Internet of Things: A Hands-On Approach" by Arshdeep Bahga & Vijay Madisetti – Practical approach with architecture, design, and cloud integration
- "Getting Started with the Internet of Things" by Cuno Pfister – Ideal for Arduino beginners with sensor interfacing and networking basics
- "Internet of Things: Architecture and Design Principles" by Raj Kamal – Covers technical architecture, protocols and design considerations
- "Exploring Raspberry Pi" by Derek Molloy – For advanced learners, focuses on Linux-based IoT development and hardware interfacing

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