

COURSE TITLE	LICENCE 'A' – ELECTRICAL INSTALLATION
COURSE AIM	<p>This course aims to prepare the participants for the Examination for General House Installation Licence "A". The Examination will consist of the following:</p> <ol style="list-style-type: none"> (1) Written test in Electrical theory – Paper 1. (2) Written test in Electrical Installation Technology-Paper 2 <p>Candidates who obtain pass marks in Papers 1 and 2 will be required to undergo a practical test based on the syllabus, and an oral Examination to test the candidate's general experience and especially his ability to interpret the IEE. Wiring and awareness of the local Electricity Supply Regulations.</p>
COURSE CONTENTS	<p><u>Electrical Theory</u></p> <p><u>Paper 1 – Syllabus</u></p> <ol style="list-style-type: none"> 1. Definitions of Electrical Quantities. 2. Electrical units, Quantity & Unit Symbols, dimensional prefixes. 3. Resistance networks, series, parallel and series parallel combinations. 4. Ohm's Law and its application to D.C. Networks. 5. Electrical Power in D.C. Circuits. 6. Electrical Energy, Cost of Energy, Single rate tariffs. 7. Resistance of conductors in terms of physical dimensions 8. Voltage drop and power loss in cables. Percentage voltage drop. 9. Insulation Resistance of cables. 10. Heat Energy (specific heat capacity) & Mechanical Energy. 11. Conversion of Electrical Energy into Heat & Mechanical Energy. 12. Illumination, Quantity & Units, Symbols. 13. Cosine Law, Point-to-Point method. 14. Photometry & Light meters. 15. Calculation of illumination by the Lumen Method. 16. Utilization Factor, Maintenance Factor, space height ratio. 17. Principle of operation and simple constructional details of moving coil and moving iron voltmeters and ammeters. 18. Induction watt meters and energy meters. Use & connections. 19. Differences between primary & secondary cells (brief description, excluding chemical equations). 20. Concept of internal resistance, e.m.f, and terminal voltage of cells. 21. Cells in series, parallel and series-parallel combinations. 22. Methods of charging, constant voltage and constant current. 23. Capacity of cells. Ampere-hour and Watt-hour efficiency. 24. Fundamental Laws of magnetism. Permanent magnets, concepts of magnetic fields, flux, and flux density. Quantity and unit symbols. <p>Operational Programme II – Cohesion Policy 2007-2013 <i>Empowering People for More Jobs and a Better Quality of Life</i> Aid Schemes part-financed by the European Union European Social Fund (ESF) Co-financing: EU Funds, National Funds, and Private Funds</p>



25. Electromagnetic Induction. Magnetic fields around current carrying conductors.
26. Magneto motive force. Electromagnets and their applications.
27. Faraday's Laws of Electromagnetic Induction, Induced emf in a conductor. ($E = Blv$).

28. Difference between AC and DC. Peak, average and rms values of sinusoidal waves. The sine wave and its form factor. Periodic time and frequency.
29. Concept of capacitance, charge and potential. Connections of capacitors in series and in parallel. Division of charge and potential.
30. Resistance, Capacitance and Inductance in ac circuits.
31. Concept of reactance and impedance.
32. AC series circuits containing resistance, inductance, capacitance and their combinations.
33. Effect of frequency on inductive and capacitive reactance.
34. Resonance in series circuits.
35. Power in single-phase circuits. Concept of power factor and its effect. Power and apparent power.
36. Measurement of resistance by substitution and direct methods.
37. The Wheat stone Bridge. (Balanced only).
38. Measurement of insulation and conductor resistance of cables in series and in parallel.
39. Double wound and auto-transformers, principle of operation, application, precautions, advantages and disadvantages.
40. Simple constructional details of core and shell type single phase transformers. Transformation ratio ($K = V_s/V_p = N_s/N_p = I_p/I_s$). Simple calculations

Electrical Installation Technology

Paper 2 - Syllabus

1. Scope of the IEE Regulations.
2. I.E.E. Definitions.
3. Requirements for safety. Handling of tools & equipment. Precautions & procedures. First aid.
4. Distributions of electricity from secondary side of substation transformers to domestic premises and small workshops.
5. The T.T. System.
6. Sequence of control in consumer's premises. Circuit diagrams.
7. Assessment of load, maximum demand, diversity and diversity factor. Use of tables.
8. Standard circuit arrangement. Lighting circuits, socket outlets, ring and radial circuits, domestic cookers and water heaters.
9. Need for protection. Fuses and M.C.B.'s. Types and applications.
10. Scope of Earthing. Description of earth circuits and bonding of extraneous metalwork. Testing for effectiveness of earthing. Types



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- of earth electrodes.
11. Special requirements for bathrooms and shower cubicles.
 12. Principal application and operation of Earth Leakage Circuit Breakers.
 13. Conducting and insulating materials commonly used in electrical installations. Properties, applications, advantages and disadvantages.
 14. Wiring systems. PVC sheathed, metal and plastic conduits. Mini trunking and skirting.
 15. IEE requirements for conductor joints and terminations. Common joints and terminations.
 16. Temporary installations, caravan and other outdoor installations (excluding large construction sites).
 17. Cable selection, size, use of Rating Factors and Rating Tables.
 18. Required size of conduits, conduit capacity and the use of tables. Fixing methods.
 19. Electrical space heating and cooking appliances. Use of 3-heat switch, simmers tats and thermostats.
 20. Water heating. Pressure and non-pressure type water heaters. Instantaneous water heaters.
 21. Bell and call circuits. Transformers, pushes, bells and indicators. Segregation.
 22. Burglar alarm circuits. Simple, open and closed circuit types.
 23. Construction and application of tungsten filament and tungsten halogen lamps.
 24. Construction and application of mercury, low and high-pressure lamps.
 25. Construction and application of sodium low and high-pressure lamps.
 26. Lamp circuits. Need for P.F. correction capacitors.
 27. Colour rendering, efficacy, advantages and disadvantages of lamps in 23... 26.
 28. Testing of installations, use of testing instruments. Faultfinding and remedies.
 29. Specifications and schedules of quantities.
 30. Reading of architects plans, use of graphical and circuit symbols to B.S.S. and I.E.C (Both accepted).

NB: Each Syllabus item is to be supported by the relevant IEE regulation.

DURATION	330 hours (110 hours – Part 1 Electrical Theory and 220 hours – Part 2 Electrical Installation Technology).
SCHEDULE	Three times a week, mornings or evenings.
VENUE	At the ETC Training Complex in Hal Far.



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ELIGIBILITY	Persons must be numerate and English-literate with a sound knowledge in physics.
FEE	Nil
CERTIFICATION	On completion of the course, the trainee has to sit for the exams organised between the Department of Education and the Enemalta Corporation. If a pass is obtained, an Electrician's Licence "A" is issued by the competent Maltese Authority.



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