



MAURITIUS QUALIFICATIONS AUTHORITY

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**NATIONAL DIPLOMA**

**LEVEL 6**

**IN**

**ELECTROMECHANICAL**

**ENGINEERING**

**&**

**RENEWABLE ENERGY**

## **National Diploma Level 6 in Electromechanical Engineering and Renewable Energy**

1. Level: 6
2. Credit total: 240
3. Review date: May 2031
4. Access to qualification

### **4.1 Entry information**

A National Certificate Level 5 qualification in the field or an alternative qualification at level 5 of the NQF.

### **4.2 Recognition of Prior Learning (RPL)**

Potential candidates holding at least three (3) years relevant experience and a recognised qualification in the relevant field at National Qualification Framework (NQF) Level 4 or 5 may obtain this qualification through the Recognition of Prior Learning (RPL) process.

## **5. Award of qualification requirements**

### **Compulsory**

*All the unit standards listed are required.*

| <b>Sn</b>                     | <b>Unit Standard Title</b>                 | <b>Level</b> | <b>Credit</b> |
|-------------------------------|--------------------------------------------|--------------|---------------|
| <b>Foundation Mathematics</b> |                                            |              |               |
| 1                             | Perform Algebraic operations               | 6            | 2             |
| 2                             | Solve Trigonometry                         | 6            | 2             |
| 3                             | Solve Vectors and Matrices                 | 6            | 2             |
| 4                             | Analyse graphical representations          | 6            | 2             |
| 5                             | Demonstrate Knowledge of Calculus Concepts | 6            | 2             |

| <b>Industrial Workshop Skills</b>                          |                                                                                      |   |   |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|---|---|
| 6                                                          | Demonstrate Basic Workshop Engineering Skills                                        | 6 | 2 |
| 7                                                          | Apply Knowledge of Metrology in Engineering                                          | 6 | 2 |
| 8                                                          | Demonstrate Understanding of Materials Science                                       | 6 | 2 |
| 9                                                          | Perform Welding Operations                                                           | 6 | 2 |
| 10                                                         | Perform Machining Operations                                                         | 6 | 2 |
| <b>Safety and Health</b>                                   |                                                                                      |   |   |
| 11                                                         | Demonstrate Knowledge of Safety and Health Principles and Practices at the Workplace | 6 | 2 |
| 12                                                         | Demonstrate Knowledge of Labour and OSHA Laws, Policies and Regulations in Mauritius | 6 | 2 |
| 13                                                         | Demonstrate Knowledge of Fire Fighting in the workplace                              | 6 | 2 |
| 14                                                         | Perform Risk Management in a workplace environment                                   | 6 | 2 |
| <b>Foundation Physics</b>                                  |                                                                                      |   |   |
| 15                                                         | Apply Mechanical Principles                                                          | 6 | 2 |
| 16                                                         | Demonstrate understanding of Machines Principles                                     | 6 | 2 |
| 17                                                         | Demonstrate understanding of thermal engineering principles                          | 6 | 2 |
| 18                                                         | Determine electrical quantities in DC circuits                                       | 6 | 2 |
| 19                                                         | Demonstrate knowledge of simple electronics devices                                  | 6 | 2 |
| <b>Electrical Systems Design, Installation and Testing</b> |                                                                                      |   |   |
| 20                                                         | Install Electrical Wiring Systems, Accessories and Distribution Boards               | 6 | 2 |
| 21                                                         | Analyse Single Phase and Three Phase Systems                                         | 6 | 2 |
| 22                                                         | Assess Low Voltage Electrical Service Installations                                  | 6 | 2 |

|                                                   |                                                                                                                        |   |   |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---|---|
| 23                                                | Install electrical protective devices                                                                                  | 6 | 2 |
| 24                                                | Perform Inspection and Testing Techniques for Electrical Service Installations                                         | 6 | 2 |
| <b>Engineering Mathematics</b>                    |                                                                                                                        |   |   |
| 25                                                | Demonstrate Understanding of Algebraic Methods in Engineering                                                          | 6 | 2 |
| 26                                                | Apply trigonometry in Engineering                                                                                      | 6 | 2 |
| 27                                                | Apply Calculus Methods in Engineering                                                                                  | 6 | 2 |
| 28                                                | Demonstrate Understanding of Probability and Statistics Methods in Engineering                                         | 6 | 2 |
| 29                                                | Demonstrate Understanding of Complex Numbers in Engineering                                                            | 6 | 2 |
| <b>Engineering Drawings with CAD Application</b>  |                                                                                                                        |   |   |
| 30                                                | Apply Engineering Drawing Techniques                                                                                   | 6 | 2 |
| 31                                                | Produce 2D Engineering Drawings Using CAD Software                                                                     | 6 | 3 |
| 32                                                | Produce 3D Engineering Drawings Using CAD Software                                                                     | 6 | 3 |
| 33                                                | Generate Products Using 3D Modelling Techniques                                                                        | 6 | 1 |
| <b>Industrial Electronics and Microprocessors</b> |                                                                                                                        |   |   |
| 34                                                | Assemble Electronic Components                                                                                         | 6 | 2 |
| 35                                                | Demonstrate understanding of Analogue Electronics                                                                      | 6 | 2 |
| 36                                                | Apply Knowledge of Digital Electronics                                                                                 | 6 | 2 |
| 37                                                | Analyse Power Electronics Circuits                                                                                     | 6 | 2 |
| 38                                                | Program Microprocessors (Microcomputers)                                                                               | 6 | 2 |
| <b>Engineering Management</b>                     |                                                                                                                        |   |   |
| 39                                                | Demonstrate understanding of Management Principles and Human Resource Practices in an Engineering Context              | 6 | 2 |
| 40                                                | Demonstrate understanding of Factors that Influence Motivation, Team Building and Leadership in Technical Environments | 6 | 2 |
| 41                                                | Demonstrate knowledge of Financial Management and Costing Techniques to Engineering Operations and Projects            | 6 | 2 |

|                                                      |                                                                                         |   |   |
|------------------------------------------------------|-----------------------------------------------------------------------------------------|---|---|
| 42                                                   | Demonstrate knowledge of Maintenance Management                                         | 6 | 2 |
| 43                                                   | Apply Project Management Principles to Organise, Monitor and Evaluate Engineering Tasks | 6 | 2 |
| <b>Electrical Machines and Standby Power Plant</b>   |                                                                                         |   |   |
| 44                                                   | Install, Commission and Maintain Single and Three Phase Motors                          | 6 | 2 |
| 45                                                   | Perform AC Electrical Motor Control and Installation                                    | 6 | 2 |
| 46                                                   | Commission AC Rotating Machines                                                         | 6 | 2 |
| 47                                                   | Perform Fault Finding, Repair and Testing of Electric Motors                            | 6 | 2 |
| 48                                                   | Demonstrate Understanding of Standby Power Plant                                        | 6 | 2 |
| <b>Energy Sustainability and Photovoltaic System</b> |                                                                                         |   |   |
| 49                                                   | Demonstrate Understanding of Sustainable Development and Photovoltaic Cells             | 6 | 2 |
| 50                                                   | Install Photovoltaic Systems                                                            | 6 | 5 |
| 51                                                   | Perform Simulation and Modelling of Photovoltaic Systems                                | 6 | 2 |
| <b>Thermodynamics and Heat Transfer</b>              |                                                                                         |   |   |
| 52                                                   | Demonstrate Understanding of Thermodynamics Laws and Principles                         | 6 | 2 |
| 53                                                   | Demonstrate Understanding of Internal Combustion Engine Systems                         | 6 | 2 |
| 54                                                   | Demonstrate Understanding of Reciprocating Air Compressor Systems                       | 6 | 2 |
| 55                                                   | Demonstrate Understanding of Steam and Gas Power Plant Systems                          | 6 | 2 |
| 56                                                   | Demonstrate Understanding of Heat Transfer Systems                                      | 6 | 2 |
| <b>Air Conditioning and refrigeration System</b>     |                                                                                         |   |   |
| 57                                                   | Analyse Psychrometric Charts                                                            | 6 | 2 |
| 58                                                   | Apply Knowledge of Vapour Compression Cycle & Calculating Performance                   | 6 | 2 |
| 59                                                   | Perform Cooling Load Calculations                                                       | 6 | 2 |

|                                              |                                                                                                                    |   |   |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---|---|
| 60                                           | Demonstrate knowledge of Cascade Systems Using Natural Refrigerants                                                | 6 | 2 |
| 61                                           | Demonstrate knowledge of Air Ventilation & Ducting Systems                                                         | 6 | 2 |
| <b>Energy Management and Energy Auditing</b> |                                                                                                                    |   |   |
| 62                                           | Demonstrate Knowledge of Energy Management Principles for Energy Conservation in Mauritius                         | 6 | 1 |
| 63                                           | Demonstrate Knowledge of Sustaining Energy Efficiency of Industrial Equipment and Systems                          | 6 | 1 |
| 64                                           | Demonstrate Knowledge of Economic and Strategic Planning of Energy Conservation Projects in Industries             | 6 | 2 |
| 65                                           | Perform Energy Auditing                                                                                            | 6 | 3 |
| 66                                           | Implement Energy and Environmental Management Systems in Industries                                                | 6 | 2 |
| <b>Fluid Mechanics</b>                       |                                                                                                                    |   |   |
| 67                                           | Demonstrate Understanding of Fluid Properties and Statics                                                          | 6 | 2 |
| 68                                           | Demonstrate Understanding of fluid kinematics concepts                                                             | 6 | 2 |
| 69                                           | Demonstrate Understanding of Fluid Dynamics                                                                        | 6 | 2 |
| 70                                           | Demonstrate Understanding of Fluid Flow Behaviours and Analysis                                                    | 6 | 2 |
| 71                                           | Demonstrate Understanding of Viscous Flows in Fluids                                                               | 6 | 2 |
| <b>Industrial Automation and Robotics</b>    |                                                                                                                    |   |   |
| 72                                           | Apply Knowledge of Instrumentation and Sensing Systems in Industrial Automation                                    | 6 | 2 |
| 73                                           | Configure Programmable logic Controllers (PLC) in Industrial Systems                                               | 6 | 2 |
| 74                                           | Configure Human Machine Interface (HMI) and Supervisory Control and Data Acquisition (SCADA) in Industrial Systems | 6 | 2 |
| 75                                           | Apply Knowledge of Robotics Systems                                                                                | 6 | 2 |
| 76                                           | Demonstrate Understanding of Industry 5.0 Technologies                                                             | 6 | 2 |
| <b>Industrial Plant Technologies</b>         |                                                                                                                    |   |   |

|                                                  |                                                                                 |   |            |
|--------------------------------------------------|---------------------------------------------------------------------------------|---|------------|
| 77                                               | Demonstrate Understanding of Diesel Engines and Mechanical Transmission Systems | 6 | 2          |
| 78                                               | Install and commission Mechanical Pump Systems                                  | 6 | 2          |
| 79                                               | Maintain Air Compressor Systems                                                 | 6 | 2          |
| 80                                               | Service Boiler Systems                                                          | 6 | 2          |
| 81                                               | Demonstrate Understanding of Plant Machinery Maintenance                        | 6 | 2          |
| <b>Alternative Renewable Energy Technologies</b> |                                                                                 |   |            |
| 82                                               | Demonstrate Understanding of Wind Power and Hybrid Power Systems                | 6 | 2          |
| 83                                               | Demonstrate Understanding of Energy Storage and Smart Grid Technologies         | 6 | 2          |
| 84                                               | Demonstrate Understanding of Hydro and Tidal Power Systems                      | 6 | 2          |
| 85                                               | Demonstrate Understanding of Biomass and Bioenergy Systems                      | 6 | 2          |
| 86                                               | Demonstrate Understanding of Ocean Energy and Hydrogen Systems                  | 6 | 2          |
| <b>Hydraulics and Pneumatics</b>                 |                                                                                 |   |            |
| 87                                               | Demonstrate understanding of Industrial Hydraulics                              | 6 | 2          |
| 88                                               | Install Industrial Electro-Hydraulics Systems                                   | 6 | 2          |
| 89                                               | Apply Knowledge of Industrial Pneumatics                                        | 6 | 2          |
| 90                                               | Analyse Industrial Electro-Pneumatics Systems                                   | 6 | 2          |
| 91                                               | Automate Industrial Hydraulics & Pneumatics Systems                             | 6 | 2          |
| <b>Industrial Project</b>                        |                                                                                 |   |            |
| 92                                               | Select a Project and Determine Specifications and Procedures                    | 6 | 10         |
| 93                                               | Implement the Project Within Agreed Procedures and to Specification             | 6 | 20         |
| 94                                               | Evaluate the Project                                                            | 6 | 20         |
| 95                                               | Make a Presentation of the Project                                              | 6 | 5          |
|                                                  | <b>Total Credits</b>                                                            |   | <b>240</b> |

## **6. Purpose**

This qualification is designed to equip learners with relevant technical competencies and the innovative mindset needed to address emerging challenges in the energy and technology sectors. Learners are expected to acquire relevant knowledge, skills and competencies to install, maintain, and manage renewable energy and electromechanical systems in line with national and global sustainability objectives. Upon successful completion of the qualification, the learner will be able to work as skilled energy technicians within the domestic, industrial, and construction sectors.