

SPECIFICATION

This document specifies the training and assessment services required to be delivered for apprentices recruited in 2018 in the Offshore Region in the Electrical Maintenance discipline.

DELIVERY OF ECITB APPRENTICESHIPS

The Engineering Construction Industry (ECI) demands that operatives working on site in the disciplines and occupations covered by ECITB apprenticeship pathways have been trained to a minimum SCQF level 7 (previously SVQ Level 3) standard. The safety-critical nature of the industry and the rigorously enforced health and safety rules and procedures dictate that any persons on-site must be able to work with a minimum of supervision.

ECITB apprentices must therefore be trained in all the fundamental and discipline-specific skills of their trade during the off-the-job period. They must experience the facilities, processes and equipment they are likely to encounter when they progress to their place of work, such that they can transfer their skills into a real working environment. With a period of supplementary coaching and experience on-the-job, applying their skills to a level 7 standard, then assessment of competence can follow.

For the avoidance of any doubt it is not sufficient to merely train ECITB apprentices to a SCQF level 5 (previously SVQ Level 2) standard in general engineering skills and then expect the additional training to occur on-the-job. This is untenable to employers working in the ECI.

The specification included in the following pages describes the qualifications to be attained off-the-job, but also the level of skill to be attained by the apprentices.

CONTRACT SPECIFICATION

The ECITB's contractual requirement is for the training provider to deliver training and assessment services leading to the ECITB's Modern Apprenticeship in Engineering Construction qualification for apprentices in the employment of employers, in-scope to the ECITB and working in the upstream oil and gas sector.

For the avoidance of doubt, the proposed contract will not extend to the training and assessment of apprentices who are not in the employment of employers in-scope to the ECITB (and possibly other contractors).

This specification document describes the activities and processes required to be undertaken by the appointed provider (Training Provider) in order to ensure that all Apprentices achieve the requirements of the relevant discipline contained within the ECITB's Modern Apprenticeship in Engineering Construction (**attached as Appendix A**).

Please note that the final number of Apprentices, discipline and work based location will not be confirmed until the recruitment phase in the cohort commencement year has concluded.

1 STANDARDS

All training and assessment services will be delivered in accordance with Engineering Construction Industry Training Board (ECITB) specifications and standards as prescribed in the following documents and publications:

- 1.1 The relevant, current apprenticeship framework document (included as **Appendix A**), which shall be either;
 - 1.1.1 The Modern Apprenticeship in Engineering Construction Framework Document for Scotland
 - 1.1.2 The Level 3 Advanced Apprenticeship in Engineering Construction (England)
 - 1.1.3 The Level 3 Apprenticeship in Engineering Construction (Wales)
- 1.2 Procedure for Achieving Approved Centre Status
- 1.3 Quality Assurance Procedures Manual
- 1.4 ECITB Assessment Strategy for Craft and Technician Vocational Qualifications at levels 2 and 3 (revised to reference QCF and SCQF August 2010) (**Appendix B**)
- 1.5 Qualification Information Booklet for the relevant Competence Qualification

2 TERMS AND DEFINITIONS

The following definitions and rules of interpretation apply in this specification:

- 2.1 **Approved Centre**
means an organisation having met all the regulatory authority's criteria approved by awarding bodies to offer assessment and verification of Competence Qualifications
- 2.2 **Awarding Body**
this is the term used to describe an organisation approved by UK government appointed regulatory authorities to award qualifications, including Competence Qualifications. The ECITB is the UK's principal awarding body for engineering construction qualifications
- 2.3 **Competence Qualification**
means the qualification a Modern Apprentice must complete and which attests his or her ability to do a job of work to a nationally recognised standard. A Modern Apprentice will complete the Competence Qualification in the workplace having been trained in the practical skills necessary to demonstrate competence in real work situations whilst off-the-job at the training provider or college. as opposed to a Knowledge Qualification, which will be achieved off-the-job, predominately in a classroom usually at a further education college.
- 2.4 **ECITB's Modern Apprenticeship Framework**
means the requirements that must be met and the qualifications to be achieved by an apprentice in order for them to successfully complete the ECITB Modern Apprenticeship. All requirements and qualifications are specified and defined in the document, titled '*A Modern Apprenticeship in Engineering Construction Framework Document for Scotland*'.

2.5 Funding Contract

Means the contract between the Training Provider and the relevant governmental body, currently Skills Development Scotland under which public funding is provided in connection with the Training provided to the Apprentice

2.6 Knowledge Qualification

means the qualification a Modern Apprentice must complete that confirms their knowledge of the fundamental aspects of their discipline, underpinning the Competence Qualification. This qualification will be achieved off-the-job, predominately in a classroom and usually at a further education college.

2.7 Pathway

means the discipline or occupation that the apprenticeship is principally concerned with. All components of the apprenticeship, particularly the Competence and Knowledge Qualifications are relevant to the pathway and associated occupation

2.8 Procedure for Achieving Approved Centre Status

means the procedure an organization must follow to become an Approved Centre, approved to deliver ECITB Competence Qualifications. Details can be found on the following page of the ECITB website:

<http://www.ecitb.org.uk/Programmes/AwardsQualifications/HowToBecomeAnApprovedCentre/>

2.9 Qualification Information Booklet

these publications provide guidance to assessors and apprentices on how assessment of each Competence Qualification should be carried out

2.10 Quality Assurance Procedures Manual

issued to ECITB Approved Centre's once approved to deliver ECITB Competence Qualifications, this manual contains the procedures the Approved Centre must follow in every aspect of assessment and internal verification activity.

2.11 Scottish Credit and Qualifications Framework (SCQF)

Is the framework that brings together all mainstream Scottish qualifications allocating them credit points, which show how much learning has been achieved, and a level which shows how demanding the learning is. It makes it possible to compare knowledge-based to competence-based qualifications.

3 APPRENTICE REGISTRATION REQUIREMENTS

3.1 External Funding

The Training Provider will secure and maintain a contract with the relevant funding agency for the purposes of funding the delivery of the component parts of the ECITB's Modern Apprenticeship Framework carry out the necessary registration of all apprentices in adherence with funding agency requirements and timescales.

3.2 Registration of Apprentices

3.2.1 The Training Provider shall register apprentices on ECITB's Modern Apprenticeship Framework (using MA On-Line) within 4 weeks of commencement of training or other notified timescale.

3.2.2 The Training Provider shall register apprentices on the Competence Qualification, relevant to the pathway within 4 weeks of commencement of training or other notified timescale.

3.2.3 The Training Provider shall register apprentices on the Knowledge Qualification, relevant to the pathway within 4 weeks of commencement of training or other notified timescale.

4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The Training Provider shall supply appropriate and adequate PPE for the respective pathways for the duration of the off-the-job training, other than overalls and safety boots.

5 INDUCTION OF APPRENTICES

5.1 The Training Provider shall conduct a thorough induction onto the ECITB Modern Apprenticeship such that each apprentice is fully aware of what to expect and what is expected of them. There shall be particular emphasis on:

5.1.2 The Training Provider's policy on health, safety and welfare

5.1.3 The Training Provider's policy on equality of opportunity

5.1.4 The Training Provider's rules and regulations, disciplinary policy and procedure and attendance and punctuality standards

5.1.5 The relevant Competence Qualification

5.1.6 The relevant Knowledge Qualification

5.1.7 Core Skills

5.1.8 Employee rights and responsibilities

5.2 In addition to the above the Training Provider shall include other topics within the induction as required by the training provider, the funding agency and other regulatory bodies.

6 OFF-THE-JOB TRAINING REQUIREMENTS

- 6.1 The Training Provider shall have all arrangements in place to enable off-the- job training to commence on a date agreed with ECITB and the chosen Provider for the 2018 cohort.
- 6.2 The Training Provider shall be able to deliver off-the-job training services from a location within Scotland or Northern England, to take account of the localities where trainees will ultimately be employed.
- 6.3 The Training Provider shall possess, or be able to access through a partnering arrangement, the essential physical resources detailed in **Table 1** required to deliver the skills elements of off-the-job training.
- 6.4 The Training Provider shall ensure all aspects of the Modern Apprenticeship Framework are delivered in compliance with the *Modern Apprenticeship in Engineering Construction Framework Document for Scotland (June 2011)*
- 6.5 The Training Provider shall have all arrangements in place to ensure all elements of off-the-Job training described briefly in **Table 2** and specified fully in **Table 5**, are completed no later than the end of May 2020.
- 6.6 The Training Provider shall deliver the various elements of off-the-job training based on the indicative timescales as detailed in **Table 3**.
- 6.7 The Training Provider shall submit monthly reports to, and in a format prescribed by, ECITB on each apprentice's progress during the off-the-job period.

Table 1 - Physical Resource Requirements**Electrical Maintenance**

Item	Physical Resource Requirement
1	A suitable Permit to Work System which mirrors the type in use at all Oil and Gas Installations. Ideally a computer based ISSOW system
2	A full range of Electrical Equipment and materials such as Twin and Earth Wiring systems, PVC conduit systems, Steel conduit systems, PVC trunking systems, Steel trunking systems, Cable tray and ladders systems, MICC cable systems, SWA cable systems and Ex Compex Systems
3	A range of control panels and accessories to enable training on wiring and installing contractor, overloads, thermal CT's, etc
4	Facilities to provide training on Mains distribution systems, various lighting maintenance systems halogen, fluorescent, metal, halide, son-t, son-x and emergency systems, motor maintenance, single phase and 3 phase direct online and star/delta starters.
5	Facilities to deliver Compex training for working in hazardous environment. Training on equipment, materials and zones of working include ex principles, ex power installation and glanding requirements and ex IS installation and glanding requirements.
6	A full range of test equipment such as Thermal imaging camera, earth loop impedance testers, RCD testers, Continuity tester, Insulation resistance testers, Oil test kits, HV test leads, Injection test sets, etc
7	Facilities to provide fault-finding, repair and maintenance on electrical equipment. Ideally on an operational plant.
8	A well-equipped workshop with adequate space where a range of electrical circuits and equipment can be installed.
9	Full and easily accessed system of maintenance manuals and diagrams for all Electrical equipment and systems.

Table 2

COMPONENT	AWARDING BODY / STANDARD SETTING BODY	REF
National Certificate (NC) in Engineering Systems (Table 5)	SQA	G9CC 46
Higher National Certificate (HNC) in Electrical Engineering (Table 5)	SQA	G7TA 15
Core Skills at SCQF Level 5 in Communication, Numeracy, Information & Communication Technology, Problem-Solving and Working with Others	SQA	N/A
SVQ Process Operations: Hydrocarbons Level 1 (8 week programme to be completed during final 12 weeks)	SQA / OPITO	G8LY 21
SVQ 2 Performing Engineering Operations at SQCF Level 5 (Table 5)	EAL	GC9W 22
Hydrocarbon Theory Training (Table 5)	ECITB	N/A
Discipline-specific skills training in accordance with ECITB specifications. (Table 5)	N/A	N/A
12 week Additional Skills programme (Table 5)	ECITB	N/A
Employee Rights and Responsibilities	ECITB	N/A
Basic Offshore Safety Induction and Emergency Training (BOSIET)	OPITO	5700
Client/Contractor National Safety Group (CCNSG) Safety Passport	ECITB	N/A
Minimum Industry Safety Training (MIST)	OPITO	N/A

Table 3

Off-the-job training indicative timescales

Training Element	Start Date	Finish Date
NC Engineering Systems	September 2018	July 2019
SVQ 2 Performing Engineering Operations	September 2018	July 2019
Core Skills	September 2018	July 2019
HNC Electrical Engineering	July 2019	December 2019
Hydrocarbon Theory	July 2019	December 2019
Discipline Skills plus BOSIET, CCNSG and MIST Training	August 2019	February 2020
12 Week Skills Programme (including SVQ Process Operations: Hydrocarbons Level 1)	March 2019	May 2020

7 WORK-BASED ASSESSMENT

It is expected that a Modern Apprentice registered on a Competence Qualification at SCQF Level 7 will be deemed competent in the minimum number of units required to complete the full award 2 years after commencing the work-based part of their training. The nature of vocational qualifications, though, will mean that provision of opportunity is pivotal and consequently the qualification may be achieved in 2 years \pm 6 months.

Table 4

PATHWAY	COMPETENCE QUALIFICATION	AWARDING BODY	REF
Electrical Maintenance	Diploma in Maintaining Engineering Construction Plant and Systems – Electrical at SCQF Level 7	ECITB	R142 04

- 7.1 The Training Provider will be an ECITB Approved Centre (or have realistic plans in place to become one prior to the commencement of the apprentices' Modern Apprenticeship), approved to offer assessment and verification of ECITB Competence Qualifications, specifically the competence qualification described in Table 5, and with adequate number of registered Assessors and Internal Verifiers.
- 7.2 If not currently an ECITB Approved Centre the Training Provider will either;
- 7.2.2 Provide ECITB with sufficient confidence that it has adequate systems, processes and resources in place to become an ECITB Approved Centre, approved to offer assessment and verification of the competence qualification

described in Table 5, or,

7.2.3 Provide ECITB with details of the sub-contracting arrangements it intends to agree with a current ECITB Approved Centre, approved to offer assessment and verification of the competence qualification described in Table 5

7.3 Where 7.2.2 above is applicable the Training Provider will follow the ECITB's Procedure for Achieving Approved Centre Status as directed in 2.9 of this schedule

7.4 The Training Provider shall assess apprentices in the workplace as they progress their Competence Qualification (detailed in **Table 4** above)- at all times complying with ECITB Awarding Body procedures as detailed in:

7.4.2 ECITB Quality Assurance Procedures Manual (*issued to all Approved Centres upon attainment of ECITB Approved Centre status*)

7.4.3 ECITB Assessment Strategy for Craft and Technician Vocational Qualifications at levels 2 and 3 (revised to reference QCF and SCQF August 2010) (**Appendix B**)

7.4.4 The Competence Qualification's Assessment Guidance Booklet (can be found by following the link described in Table 4)

7.5 The Training Provider shall regularly review the progress of apprentices throughout the apprentices' work-based element of their Modern Apprenticeship.

7.6 The Training Provider shall submit monthly reports to ECITB, in a format prescribed by ECITB, on each apprentice's progress during the work-based element of their Modern Apprenticeship.

7.7 The Training Provider shall liaise with ECITB to convene quarterly review meetings where all aspects of work-based assessment can be discussed and actions agreed.

7.8 The Training Provider shall ensure ECITB are informed at the earliest possible juncture of any barriers in the way of apprentices successfully completing the SVQ Level 3 and, subsequently, the ECITB Modern Apprenticeship Framework.

8 PERSONNEL DEPLOYED

The Training Provider shall ensure that all persons delivering training and assessing candidates in the workplace have the necessary qualifications, experience and have passed all necessary checks as required by the ECITB Awarding Body, funding agency and all other relevant, regulatory authorities.

9 THIRD PARTY AUDITING

9.1 The Training Provider shall provide the ECITB with results of all quality and health and safety audits in relation to the training and/or assessment of ECITB apprentices.

9.2 The Training Provider shall work with ECITB in resolving any issues that arise as a result of quality and health and safety audits in relation to the training and/or assessment of ECITB apprentices.

10 BENCHMARKING

The Training Provider shall endeavour to meet agreed targets - no more stringent than those agreed by the Training Provider with the relevant funding agency - with ECITB in relation to achievement, retention, etc. of ECITB apprentices

11 INSURANCE

During the term of this Agreement and for a period of one year thereafter, the Training Provider shall maintain in force with reputable insurance company insurance for the sum of £10,000,000 per event, including the following risks:

- 11.1 employers' liability insurance in respect of all persons involved in delivery of the Training and performance of this Agreement;
- 11.2 public liability insurance to cover against any suit or action, claims or demands brought or made by any person injured or suffering loss or damage in connection with the carrying out of the Training and performance of this Agreement;
- 11.3 business interruption in the event that the Training Provider is unable to perform the Training.

Table 5

G9CC 46 National Certificate (NC) in Engineering Systems		
Titles	Unit Number	Credit Value
Mandatory		
Communications	F3GB 12	1
Mathematics: Technician 1	F3HX 12	1
Engineering: Applying Information Technology	F5D4 12	1
Restricted Core		
Mechanical Engineering Principles	F6X7 12	1
Electrical Principles	F5HL 12	1
Single Phase & 3 Phase Principles	F5JV 12	1
Process Chemistry: An Introduction	F6X9 12	1
Process Measurement & Control: An Introduction	F6X8 12	1
Optional Units (all to be completed)		
Engineering Dynamics: An Introduction	F5K6 12	1
Thermofluids	F5JE 12	1
Applications of PLCs	F5HD 12	1
Engineering: Distributed Control Systems	F5KM 12	1
Process Operations: Oil and Gas Separation	F6XA 11	1
Process Operations: Gas Processing Operations	F6XB 11	1
Process Operations: Utilities	F6XC 11	1
Engineering: Hazards, Protection Methods and Functional Safety	F5KP 12	1
Additional Units		
Mathematics: Technician 2	F3HY 12	1
Statics	F5K8 12	1

Table 5 continued

GC9W 22 SVQ 2 Performing Engineering Operations at SQCF Level 5		
Unit Titles		SQCF Level
Working Safely in an Engineering Environment		5
Working Efficiently and Effectively in Engineering		5
Using and Communicating Technical Information		5
Wiring and Testing Electrical Equipment and Circuits		5
Assembling Wiring and Testing Electrical Panels/Components in mounted enclosures		5
Maintaining Electrical Equipment and Systems		5
Higher National Certificate - Electrical Engineering: G7TA 15		
Unit Titles	Unit Number	Credit Value
Mandatory Units		
Communication: Practical Skills	D77G 34	1
Mathematics: for Engineering 1 : Electrical and Electronics	DG4H 33	1
Quality Management: An Introduction	DT8Y 34	1
Three Phase Systems	DN47 34	1
Electricity Power Systems	DN3W 34	1
Electrical Machine Principles	DN4J 34	1
Electrical Safety	DN4L 34	1
Single Phase AC Circuits	DG54 34	1
Application of Electrical and Electronic Instruments	DN48 33	1
Electrical Engineering: Graded Unit 1 Examination	DN3V 34	
Optional Units		
Inspection and Testing of Low Voltage Installations	DN41 34	1
Electrical Systems in potentially explosive & gas hazardous environments	DN3T 34	1
The 12 Weeks (60 days) Skills Programme		
Training Element		Duration
G8LY 21 Processing Operations: Hydrocarbons Level 1		40 days
Diagrams used across all disciplines (an appreciation of P&IDs, loop diagrams, cause and effect, piping diagrams, schematic diagrams etc.)		2 days
Gas Testing Awareness (Authorised Gas Tester Level 3)		0.5 days
Task Based Risk Assessment		0.5 days
ISSOW Level 1		1 day
Small bore fittings (different types, make and break etc)		3 days
An understanding of hydro-testing and leak testing basics (an awareness of hazards and dangers with practical elements covered during this session).		3 days
Competence Test on Electrical Maintenance Skills – Report on each trainee to be developed by Training Provider		5 days
Holidays		5 days

Table 5 continued

HYDROCARBON THEORY TRAINING

(The figures in brackets represent a notional number of learning hours, for guidance only)

1. INTRODUCTION TO OIL AND GAS INDUSTRY (10)

Objectives

On completion of this training the learner shall demonstrate an understanding of:

- What is Oil and Gas?
- The history of Oil and Gas
- How Oil and Gas is formed
- Exploring for Oil and Gas
- Recovering Oil and Gas

2. PROCESS PARAMETERS AND PROCESS HAZARDS (20)

Objective

On completion of this training the learner shall demonstrate a high level of awareness of the major hazards encountered on a typical offshore and onshore installation, including but not limited to:

- Pressure
- Temperature
- Level
- Flow
- Radiation (LSA or NORM)
- Chemical Hazards (including COSHH)
- Hydrocarbon Flammability
- H₂S
- Nitrogen, Halon replacement
- Mercury
- Corrosion (including under insulation)
- Erosion
- HP/LP Interfaces

3. PROCESS EQUIPMENT (35)

Objective

On completion of this training the learner shall have an appreciation and understand the basic operating principles of all types of equipment including:

- Piping standards
- Valves
- Well Completions
- Wellheads and Christmas Trees
- Separators
- Heat exchangers
- Pumps
- Filter systems
- Compressors
- Hydrocarbons
- Turbo – expanders

4. PROCESS SYSTEMS (40)

Objective

On completion of this training the learner shall demonstrate an understanding of all major process systems, how they work, reason for use and common failures.

- Oil/Water/Gas/Seperation
- Gas compression
- Produced Water Treatment
- Gas dehydration
- Sea Water Injection and Produced Water Re-Injection
- Gas Lift
- Subsea systems
- Metering and measurement
- Power Generation and Gas Turbine Drivers
- Distillation and Fractionation (NGL's)
- Impurity removal (H₂S, CO₂ etc)

5. PROCESS UTILITIES (30)

Objective

On completion of this training the learner shall demonstrate an understanding of the use and requirements of utility systems including those associated with the accommodation and life support systems including:

- Instrument and Plant Air
- Fuel Gas
- Flare System
- Vent System
- Drains
- Heating Medium System
- Cooling Medium System
- Firewater System
- Plant Water System
- Diesel Systems
- Inerting Systems
- Portable Water System
- Heating, Ventilation and Air Conditioning (HVAC) System
- Platform Living Quarters

6. OIL AND GAS STRUCTURES AND INFRASTRUCTURE (15)

Objective

On completion of this training the learner shall demonstrate and understanding of the basic structures and infrastructures associated with the oil and gas extraction industry, including:

- Production Platforms
- Central Process Facilities
- FSPOs and Tanker Offloading
- Semi – Submersibles
- Gas Plants
- Pipeline Systems
- Transport and Supply Logistics

7. SAFETY SYSTEMS (20)

Objectives

On completion of this training the learner shall demonstrate a full understanding of:

- Health, Safety and Environment (HSE) Legislation
- Emergency Shutdown System (ESD)
- Emergency Depressurisation (EDP) or Blowdown
- Fire and Gas Systems
- Cause and Effect Diagrams
- Emergency Response Systems
- Process Isolations
- Permit – to – Work Systems
- Work briefing systems (e.g. toolbox talks)
- Risk Assessment

8. PRODUCTION OPERATIONS (20)

Objectives

On completion of this training the learner shall demonstrate an understanding of production operations, including:

- Job roles and responsibilities
- Typical work patterns (shift cycle, crew-change)
- Plant start up procedures
- Plant shutdown procedures
- Process Fault finding
- Critical Situation Response
- Control Room Operations
- Communication systems (radio, public address, telephone and satellite)
- Override systems and procedures
- Handovers
- Plant monitoring
- Isolations and de-isolations, integrity, leak testing etc

9. PROCESS OPERATIONS AND DOCUMENTATION (10)

Objectives

On completion of this training the learner shall demonstrate an understanding of the requirement, both legally and functionally, for specific documentation, their use and importance and method of maintaining same to a suitable standard including:

- Process Flow Diagrams (PFDs)/Process Flow Schemes (PFS)
- Piping and Instrument Diagrams (P&IDs)
- Process Engineering Flow Schematics (PEFS)
- Plot Plans
- Plant Logs
- Operating Procedure Manuals
- Operating Standards
- Plant Integrity (Maintenance systems, condition monitoring and planned shutdown)

10. SAFETY OF SELF AND OTHERS (10)

Objectives

On completion of this training the learner shall demonstrate a full understanding of:

- Implications of Health and Safety at Work Legislation
- Standard of behaviour in the workplace
- Safety Rules and Responsibilities
- Why Safety Meetings are important
- Why Audits are important

Table 5 continued

DISCIPLINE-SPECIFIC SKILLS TRAINING – ELECTRICAL MAINTENANCE

TRAINING OBJECTIVES

The objectives of the discipline-specific skills training programme are to provide each apprentice with:

- (a) Experience on the Installation, Maintenance and repair of AC/DC switch and fuse gear and rotating machines associated with an industrial environment.
- (b) Specialist training in a range of HV equipment.
- (c) An appreciation and understanding of legislation safety procedures on and offshore

TIMEFRAME

The training described in the following pages is to commence in July at the end of training year one and conclude in March, midway through training year two. It may be that some of the topics and the 'appreciation', theoretical aspects of the content will have been delivered as part of the HNC, or possibly in a few instances, the PEO programme.

In total the number of learning hours should **total 510 hours** (or 85 days)

CONTEXT

The discipline-specific skills training is only one part of the overall UOGITTS off-the-job training programme, the other constituent parts are summarised in the table below.

Induction	5 days
PEO	60 days
National Certificate	90 days
Higher National Certificate	70 days
Discipline Specific Skills Training	85 days
Hydrocarbon Theory	28 days
Additional Skills Programme (including Processing of Hydrocarbons)	55 days
CCNSG Safety Passport/BOSIET/MIST	7 days
Holidays	50 days
Total	450 days (90 weeks)

TRAINING CONTENT – ELECTRICAL MAINTENANCE

1. Rotating Machines.
2. Speed Control.
3. Control Systems.
4. Power Systems.
5. Fault Diagnosis.
6. The installation, operation, maintenance of power generation units, transformation units and distribution systems HV/LV systems.
7. The installation, operation, maintenance of certified equipment associated with hazardous areas.
8. Conditional based-maintenance systems.
9. The maintenance and operation of battery/inverter systems.
10. Failsafe equipment and circuits.
11. The operation of planned maintenance.
12. Protective systems – HV.
13. Safety, legislation, practices on and offshore, safety engineering.

TRAINING ACTIVITIES – ELECTRICAL MAINTENANCE

(The figures in brackets represent a notional number of learning hours, for guidance only)

1. **ROTATING MACHINES (70)**
 - Assembly/disassembly rotating machines, induction, repulsion, AC/DC, Inspection, test and test run.
2. **SPEED CONTROL (30)**
 - Introduction to the thyristor/thyristor motor drives.
3. **CONTROL SYSTEMS (30)**
 - Control systems, start, stop, forward, reverse AC.
4. **POWER SYSTEMS (40)**
 - Single line diagram distribution networks.
5. **FAULT DIAGNOSIS (20)**
 - Conventional and electronic introduction and use of oscilloscope

6. **THE INSTALLATION, OPERATION, MAINTENANCE OF POWER GENERATION UNITS, TRANSFORMATION UNITS AND DISTRIBUTION SYSTEMS HV/LV SYSTEMS (80)**
 - Commissioning, assembly, disassembly, testing, inspection, test run, running up/and running in procedures, maintenance oil tests, distribution systems and types.
7. **CERTIFIED EQUIPMENT ASSOCIATED WITH HAZARDOUS AREAS (80)**
 - Zoning, zener barriers, terminating equipment, maintenance procedures.
8. **CONDITION-BASED MAINTENANCE (30)**
 - Polarisation index, thermography, and partial discharge testing of rotating machines.
9. **THE MAINTENANCE & OPERATION OF BATTERY/INVERTER SYSTEMS (30)**
 - Inspection test and check procedures.
10. **FAILSAFE EQUIPMENT AND CIRCUITS (20)**
 - Castello systems interlocks, one fault protection systems.
11. **THE OPERATION OF PLANNED MAINTENANCE (20)**
 - Initiation collation, operation of planned maintenance schemes theory and practice.
12. **PROTECTIVE SYSTEMS-HV (30)**
 - Reverse power/field failure/differential/restricted earth fault.
13. **ELECTRICAL SAFETY LEGISLATION,PRACTICES ON AND OFFSHORE,SAFETY ENGINEERING (30)**
 - Electrical safety, regulations with respect to substation equipment and practices on systems of supply up to and including 11Kv. Safety, permit to work, section to test, legislation on and offshore HSW Act 1974 Section 2 Part 6 (Electricity at Work Regulations).