



south essex college

SKILLS | EDUCATION | CAREERS

# ENGINEERING TECHNICIAN- MARITIME APPRENTICESHIP

## SPECIALISMS:

- MARITIME MECHANICAL FITTER
- MARITIME ELECTRICAL FITTER
- MARITIME FABRICATOR

# ROLE PROFILE

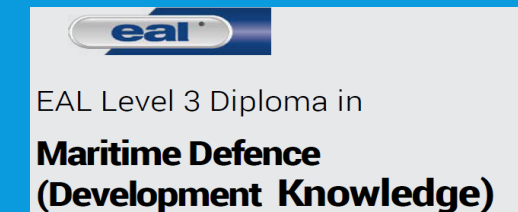
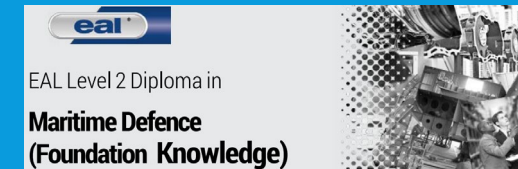
## Maritime Engineering

- **Maritime Mechanical Fitter** - The Mechanical Fitter role involves working from engineering drawings, data and documentation in order to undertake the manufacture, installation, testing, commissioning, fault diagnosis, maintenance, overhaul and removal of mechanical and fluid power equipment on ships and submarines involved in defence and commercial shipping. This can include propulsion machinery, weapons, reactor and auxiliary systems (such as water, air conditioning and power generation). It requires knowledge and expertise in the use of common and specialist machine and hand tools, and the use of a variety of measuring and diagnostic equipment and processes to ensure individual components and assemblies meet the required specification. The Mechanical Fitter must comply with statutory regulations and organisational safety requirements and will be expected to work both individually and as part of a team. On completion of the Apprenticeship they will be able to work with minimum supervision, taking responsibility for the quality and accuracy of the work they undertake and will be proactive in finding solutions to problems and identifying areas to improve business processes.
- **Maritime Electrical Fitter** - The Electrical Fitter utilises engineering drawings, data and documentation in order to undertake the manufacture, installation, testing, commissioning, fault diagnosis, maintenance, overhaul and removal of electrical and data systems on maritime vessels. This covers propulsion machinery, weapons, sensors, reactor and auxiliary systems (such as water, air conditioning, electronic equipment including programmable logic controllers, power generation and distribution). It requires knowledge and expertise in the use of common and specialist electrical equipment, machines and hand tools, and the use of a variety of measuring and diagnostic equipment and processes to ensure individual components and assemblies meet the required specification.
- **Maritime Fabricator** - This role involves the fabrication, construction and repair of structures for defence and commercial vessels. This is achieved by working from engineering drawings, data and documentation. It requires knowledge and expertise in the use of machine and hand tools involved in preparing and cutting materials, this can include hot working processes such as welding, thermal cutting and grinding. A variety of measuring equipment, diagnostic techniques and processes are used to ensure individual components and assemblies meet the required specification. The Fabricator must comply with statutory regulations and organisational safety requirements and will be expected to work both individually and as part of a team. They will be able to work with minimum supervision, taking responsibility for the quality and accuracy of the work they undertake and will be proactive in finding solutions to problems and identifying areas to improve business processes.

# MANDATORY QUALIFICATION

After a period of foundation skills and technical knowledge development all apprentices will be required to achieve the following qualifications:

1. Level 2 Diploma in Maritime Defence (Foundation Competence)
2. Level 2 Diploma in Maritime Defence (Foundation Knowledge)
3. Level 3 Diploma in Maritime Defence (Development Competence)
4. Level 3 Diploma in Maritime Defence (Development Knowledge)



# LEVEL 2 DIPLOMA IN MARITIME DEFENCE

(FOUNDATION KNOWLEDGE)



EAL Level 2 Diploma in

## Maritime Defence (Foundation Knowledge)

Learners will have to complete the following :

- Three mandatory units
- Three optional units

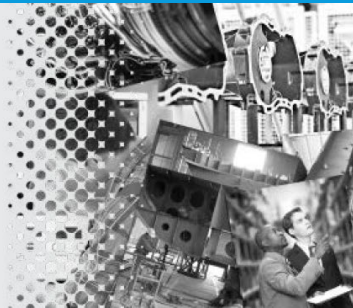
### Mandatory Units

MDEK2-001	Working in a marine engineering environment
MDEK2-002	General engineering principles
MDEK2-003	General engineering mathematics and science

EAL Code	Optional Units: <i>A minimum of three optional units must be completed</i>
MDEK2/004	Business-Improvement Techniques
MDEK2/005	Principles of electrical and electronic technology - <b>Recommended</b>
MDEK2/006	General machining applications (turning and milling)
MDEK2/007	Principles of welding and fabrication - <b>Recommended</b>
MDEK2/008	Principles of pipework fabrication
MDEK2/009	Principles of electrical maintenance
MDEK2/010	Principles of mechanical maintenance
MDEK2/011	Assembling and maintaining fluid power systems
MDEK2/012	Constructing, testing and fault finding electronic circuits
MDEK2/013	Electrical inspection and testing
MDEK2/014	Thermal cutting techniques
MDEK2/015	Sheet metalwork techniques
MDEK2/016	Plate metalwork techniques
MDEK2/017	Principles of mechanical assembly and fitting – <b>Recommended</b>
MDEK2/018	Principles of Computer Aided Design (CAD)

# LEVEL 2 DIPLOMA IN MARITIME DEFENCE

(FOUNDATION KNOWLEDGE)



EAL Level 2 Diploma in

## Maritime Defence (Foundation Competence)

Learners will have to complete the following :

- Three mandatory units
- Four optional units

### Mandatory Units

MDEC2-001	Complying with statutory regulations and organisational safety requirements (Maritime Defence)
MDEC2-002	Working efficiently and effectively in an engineering environment (Maritime Defence)
MDEC2-003	Using and communicating technical information (Maritime Defence)

EAL Code	Optional Units: <i>A minimum of four optional units must be completed</i>
MDEC2-004	Producing components using hand fitting techniques (Maritime Defence) - <b>Recommended</b>
MDEC2-005	Producing mechanical assemblies (Maritime Defence)
MDEC2-006	Forming and assembling pipework systems (Maritime Defence)
MDEC2-007	Maintaining mechanical devices and equipment (Maritime Defence) - <b>Recommended</b>
MDEC2-008	Assembling and testing fluid power systems (Maritime Defence)
MDEC2-009	Maintaining fluid power equipment (Maritime Defence)
MDEC2-010	Producing sheet metal components and assemblies (Maritime Defence)
MDEC2-011	Producing platework components and assemblies (Maritime Defence)
MDEC2-012	Cutting and shaping materials using thermal cutting equipment (Maritime Defence)
MDEC2-013	Preparing and using manual metal arc welding equipment (Maritime Defence)
MDEC2-014	Preparing and using manual TIG or plasma-arc welding equipment (Maritime Defence)
MDEC2-015	Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment (Maritime Defence)
MDEC2-016	Preparing and using manual flame brazing and braze welding equipment (Maritime Defence)
MDEC2-017	Wiring and testing electrical equipment and circuits (Maritime Defence)
MDEC2-018	Forming and assembling electrical cable enclosure and support systems (Maritime Defence)
MDEC2-019	Assembling, wiring and testing electrical panels/components mounted in enclosures (Maritime Defence) - <b>Recommended</b>
MDEC2-020	Maintaining electrical equipment/systems (Maritime Defence)
MDEC2-021	Using wood for pattern, model making and other engineering applications (Maritime Defence)
MDEC2-022	General machining applications (turning and milling) (Maritime Defence)
MDEC2-023	General welding applications (Maritime Defence) - <b>Recommended</b>

# LEVEL 3 DIPLOMA IN MARITIME DEFENCE

(DEVELOPMENT TECHNICAL KNOWLEDGE)



EAL Level 3 Diploma in

## Maritime Defence (Development Knowledge)

Learners will have to complete the following :

- Three mandatory units
- One pathway mandatory unit
- Four optional units

EAL Code	Pathway mandatory units: one pathway mandatory unit must be completed:
MDEK3/004	Principles of mechanical engineering
MDEK3/005	Principles of electrical and electronic engineering
MDEK3/006	Principles of fabrication and welding
MDEK3/007	Principles of pipework fabrication

EAL Code	Four optional units (Recommended )
QET3/038	Installation of electrical equipment
QET3/020	Tungsten inert gas (TIG) welding process
QET3/005	Further engineering science
QET3/033	Maintenance of fluid power systems and components

EAL Code	Unit title – Mandatory Units
AME3/001A	Engineering and environmental health and safety.
MDEK3/002	Engineering principles.
AME3/004	Engineering mathematics.

Refer to appendix A for full list of optional units.

# LEVEL 3 DIPLOMA IN MARITIME DEFENCE

(DEVELOPMENT TECHNICAL COMPETENCE)




EAL Level 3 Diploma in

## Maritime Defence (Development Competence)

Learners will have to complete the following :

- Three mandatory units
- Three optional units (1,486 H min GLH) as per employer's requirements.

### Mechanical Fitter Pathway – 1600 GLH

EAL Code	Unit title – Optional Units – Recommended
MDEC3-031	Reassembling and refitting marine mechanical equipment (Maritime Defence) – 700GLH
MDEC3-030	Dismantling and removing marine mechanical equipment (Maritime Defence) – 700GLH
MDEC3-035	Handing over and confirming completion of maintenance activities (Maritime Defence) – 200GLH

### Electrical Fitter Pathway – 1560 GLH

EAL Code	Unit title – Optional Units – Recommended
MDEC3-053	Installing marine power generation and distribution equipment and systems (Maritime Defence) – 860 GLH
MDEC3-041	Testing electronic equipment and circuits (Maritime Defence) -500GLH
MDEC3-035	Handing over and confirming completion of maintenance activities (Maritime Defence) – 200GLH

#### EAL Code Unit title – Mandatory Units

MDEC3-001	Complying with statutory regulations and organisational safety requirements (Maritime Defence)
MDEC3-002	Using and interpreting engineering data and documentation (Maritime Defence)
MDEC3-003	Working efficiently and effectively in advanced manufacturing and engineering (Maritime Defence)

# PLANNED DELIVERY

- Level 2 Diploma in Maritime Defence (Foundation Competence)
- Level 2 Diploma in Maritime Defence (Foundation Knowledge)
- English & Maths ( If required)
  
- Day Release @SEC

Year 1



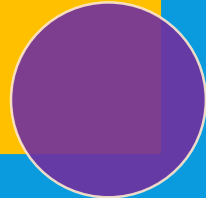
- Level 3 Diploma in Maritime Defence (Development Knowledge) – **4 units**
- Level 3 Diploma in Maritime Defence (Development Competence)
  
- Day Release @SEC

Year 2



- Level 3 Diploma in Maritime Defence (Development Knowledge) – **3 units**
- Level 3 Diploma in Maritime Defence (Development Competence)
  
- Day Release @SEC

Year 3



- Level 3 Diploma in Maritime Defence (Development Competence)
- **END POINT ASSESSMENT**
  
- Day Release @SEC

Year 4



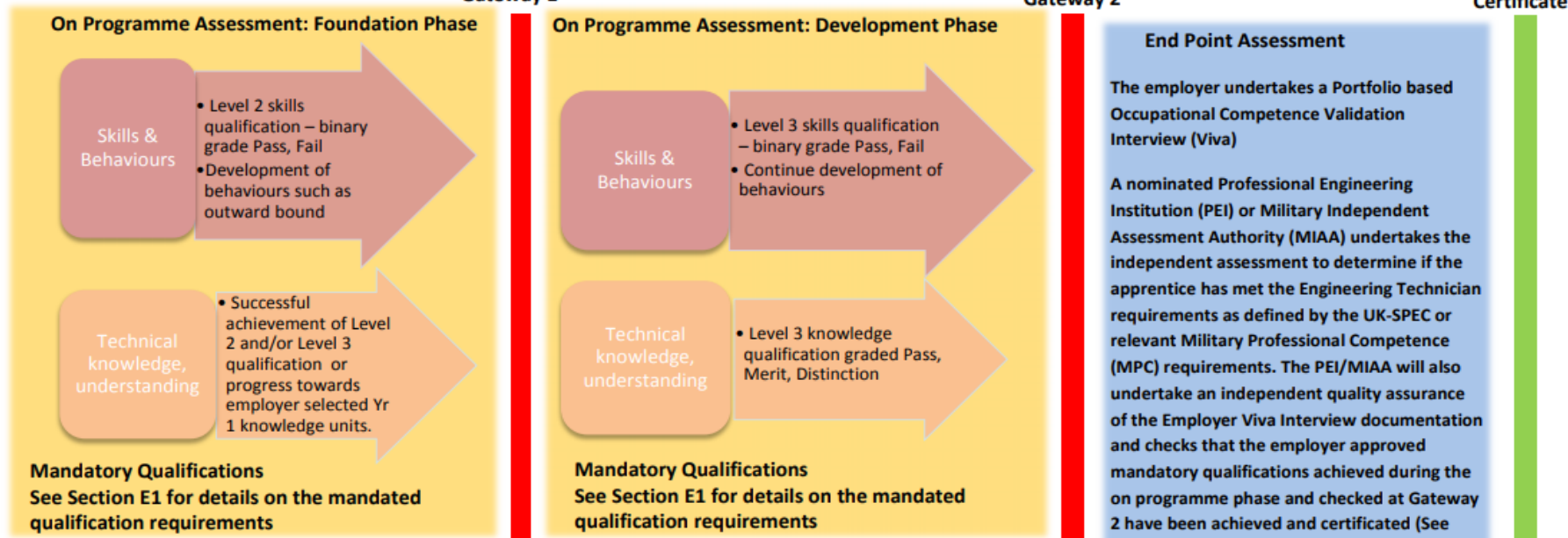


# ENTRY REQUIREMENTS

- Candidates will require GCSE's at Grade C/4 or equivalent – including English and math.

# END POINT ASSESSMENT

A2 Diagram 2a: Summary approach to "On-Programme" and End Point Assessment – Engineering Technician Gateway 1 Gateway 2



**Gateway 1: Review & Assessment – Undertaken by the employer**

The following must be completed before the apprentice can progress to the Development Phase of the apprenticeship:

- The employer specified Level 2 Foundation Occupational Competence Qualification
- Where applicable the Level 2 Foundation Knowledge Qualification and/or satisfactory achievement /progress towards Yr 1 Level 3 Technical Knowledge units as applicable to the occupational pathway requirements
- Satisfactory progress towards the employer required behaviours

Note. As well as the mandated qualifications the following occupational pathways also requires the successful completion of an externally moderated Foundation Phase assessment: Mechatronics Maintenance Technician and Product Design and Development Technician.

**Gateway 2: Review & Assessment - Undertaken by the employer**

In order to be ready for End Point Assessment the apprentice must have achieved:

- Pass, Merit or Distinction in the selected Level 3 Technical Knowledge Qualification
- A binary grade Pass in the Level 3 Occupational Competence Qualification
- The required Behaviours aligned to EngTech or Military Professional Competence
- English and Maths qualifications at Level 2

**Apprentice Completion Certificate: Final employer Sign Off & PEI/MIAA applies for the Apprentice's completion certificate.**

# APPENDIX A

## List of optional units

QET3/002	Engineering organisational efficiency and improvement
QET3/3A	Further engineering mathematics
QET3/004	Further electrical and electronic principles
QET3/005	Further engineering science
QET3/006	Computer aided design (CAD) techniques
QET3/015	Electrical testing and commissioning
QET3/017	Pattern development
QET3/018	Manual metal-arc (MMA) welding
QET3/019	Metal inert gas, Metal active gas (MIG/MAG)welding

QET3/063	Electrical power for engineering applications
QET3/064	Engineering communications
QET3/076	Digital systems
QET3/077	Workplace improvement

QET3/020	Tungsten inert gas (TIG) welding process
QET3/023	Producing sheet metal fabrications
QET3/023A	Sheet metalwork technology
QET3/024	Producing plate fabrications
QET3/027	Shipbuilding operations
QET3/028	Maintenance engineering principles
QET3/029	Maintenance of mechanical systems
QET3/030	General engineering maintenance techniques
QET3/031	Building mechanical maintenance systems and services
QET3/032	Maintenance of refrigeration systems
QET3/033	Maintenance of fluid power systems and components
QET3/034	Maintenance of hydraulic systems and components
QET3/035	Maintenance of pneumatic systems and components
QET3/036	Electrical maintenance in buildings
QET3/038	Installation of electrical equipment
QET3/042	Engineering inspection and quality control
QET3/046	Advanced milling
QET3/047	Advanced turning
QET3/050	Data communications and networking
QET3/057	Radio and radar principles
QET3/062	Panel wiring for engineering applications

# APPENDIX B



MDEC3-004	Bending and forming marine pipe using bending machines and hand methods (Maritime Defence)
MDEC3-005	Assembling marine pipework (Maritime Defence)
MDEC3-006	Installing marine pipework, components and systems (Maritime Defence)
MDEC3-007	Preparing and testing marine pipework systems (Maritime Defence)
MDEC3-008	Joining marine pipework by manual torch brazing and soldering (Maritime Defence)
MDEC3-009	Surveying marine pipework systems (Maritime Defence)
MDEC3-010	Producing socket and flange fillet welded joints in pipe using a manual welding process (Maritime Defence)
MDEC3-011	Marking off marine structural steelwork components (Maritime Defence)
MDEC3-012	Assembling fabricated components to produce marine sub-assemblies (Maritime Defence)
MDEC3-013	Cutting and shaping materials using portable thermal cutting equipment (Maritime Defence)
MDEC3-014	Assembling sub-assemblies and components to produce major marine structural assemblies (Maritime Defence)
MDEC3-015	Cutting materials using hand and machine tools (Maritime Defence)
MDEC3-016	Forming marine components using power rolling machines (Maritime Defence)
MDEC3-017	Forming marine components using a power press (Maritime Defence)
MDEC3-018	Operating CNC fabrication machines (Maritime Defence)
MDEC3-019	Outfitting marine steelwork (Maritime Defence)
MDEC3-020	Tack welding marine plate using a manual welding process (Maritime Defence)
MDEC3-021	Carrying out pattern development for marine applications (Maritime Defence)
MDEC3-022	Marking out components for metalwork (Maritime Defence)

MDEC3-023	Developing and marking out templates for metalwork (Maritime Defence)
MDEC3-024	Cutting and shaping materials using portable thermal cutting equipment (Maritime Defence)
MDEC3-025	Producing and finishing holes using drilling machines (Maritime Defence)
MDEC3-026	Producing platework assemblies (Maritime Defence)
MDEC3-027	Joining fabricated components using mechanical fasteners (Maritime Defence)
MDEC3-028	Producing fillet welded joints using a manual welding process (Maritime Defence)
MDEC3-029	Restoring marine mechanical components to usable condition by repair (Maritime Defence)
MDEC3-030	Dismantling and removing marine mechanical equipment (Maritime Defence)
MDEC3-031	Reassembling and refitting marine mechanical equipment (Maritime Defence)
MDEC3-032	Overhauling marine propulsion systems (Maritime Defence)
MDEC3-033	Overhauling marine hydraulic systems and equipment (Maritime Defence)
MDEC3-034	Overhauling marine systems plant and equipment (Maritime Defence)
MDEC3-035	Handing over and confirming completion of maintenance activities (Maritime Defence)
MDEC3-036	Carrying out fault diagnosis on mechanical equipment (Maritime Defence)
MDEC3-037	Maintaining mechanical equipment (Maritime Defence)
MDEC3-038	Carrying out preventative planned maintenance on mechanical equipment (Maritime Defence)
MDEC3-039	Carrying out condition monitoring of plant and equipment (Maritime Defence)
MDEC3-040	Carrying out fault diagnosis on electronic equipment and circuits (Maritime Defence)
MDEC3-041	Testing electronic equipment and circuits (Maritime Defence)

# APPENDIX B



MDEC3-042	Repairing electronic equipment (Maritime Defence)
MDEC3-043	Carrying out fault diagnosis on engineered systems (Maritime Defence)
MDEC3-044	Carrying out preventative planned maintenance on engineered systems (Maritime Defence)
MDEC3-045	Maintaining mechanical equipment within an engineered system (Maritime Defence)
MDEC3-046	Maintaining electrical equipment within an engineered system (Maritime Defence)
MDEC3-047	Maintaining fluid power equipment within an engineered system (Maritime Defence)
MDEC3-048	Maintaining process controller equipment within an engineered system (Maritime Defence)
MDEC3-049	Assembling mechanical products (Maritime Defence)
MDEC3-050	Repairing and modifying mechanical assemblies (Maritime Defence)
MDEC3-051	Checking that completed assemblies comply with specification (Maritime Defence)
MDEC3-052	Installing cable runs and circuits in marine structures (Maritime Defence)
MDEC3-053	Installing marine power generation and distribution equipment and systems (Maritime Defence)
MDEC3-054	Installing marine lighting, alarm, detection and monitoring equipment and systems (Maritime Defence)
MDEC3-055	Installing marine electrical/electronic equipment and systems (Maritime Defence)
MDEC3-056	Overhauling marine electrical/electronic plant, equipment and systems (Maritime Defence)