# Award in Physics and Mathematics for Electrical Fitters

## Applying for this course:

To apply for this course, you should have completed compulsory schooling up to 65 years of age and have a MQF level 1 qualification in Mathematics, English or Maltese language. Individuals who do not possess the entry requirements will be requested to do a pre-assessment to determine the learner's level of competence in Mathematics, English or Maltese. Learners need to successfully pass (45%) a Pre-Assessment Test approved by Jobsplus to be eligible. If you do not have these qualifications but possess other qualifications or relevant experience, kindly contact us on ga.jobsplus@gov.mt stating your ID card number, attaching copies of your qualifications and a copy of your CV highlighting your work experience.

## Course Duration

This course is of 100 hours duration and consists of four Modules.

- Module 1 is of 16.5 hours duration - (including 1.5-hour assessment)
- Module 2 is of 33.5 hours duration - (including 2-hour assessment)
- Module 3 is of 16.5 hours duration - (including 1.5-hour assessment)
- Module 4 is of 33.5 hours duration - (including 2-hour assessment)

## General pedagogical guidelines and procedures for this course:

The delivery of this Unit will be mainly held through a series of discussions and hands–on exercises. The trainer will also be holding lessons with the learners which will consist of various presentations.

## General assessment policy and procedures for this course:

The learner will be assessed through a written test at the end of each module.

## Module 1 Learning Outcomes- **Mathematics I**

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| ✓ Create lists of odd and even numbers from a given number set<br>✓ Create a list of prime numbers from a given number set;<br>✓ Carry out mathematical tasks utilising negative numbers in a given context;<br>✓ Carry out basic arithmetic operations utilising positive and negative whole numbers;<br>✓ Carry out basic arithmetic operations utilising factors and multipliers<br>✓ Carry out basic arithmetic operations utilising fractions and decimals and rounding off up to three decimal places;<br>✓ Deal with the mathematical rules for ratios<br>✓ Deal with the mathematical rules for proportions<br>✓ Deal with the mathematical rules pertaining to percentages | ✓ Comply with the mathematical rules when dealing with the range, mean, mode and median for a set of given values;<br>✓ Carry out mathematical tasks on a given set of numbers to determine the range, mean, mode and median values;<br>✓ Carry out mathematical tasks related to the above learning outcomes utilising a scientific calculator<br>✓ Ensure the proper International System of Units (SI units) symbols are utilised in a given context;<br>✓ Carry out tasks utilizing the appropriate Multiples and Sub multiples of the SI Units;<br>✓ Carry out conversions of units into alternative base standard units of measurement, for the identical quantity, by |

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| ✓ Deal with the mathematical rules pertaining to reciprocals<br>✓ Carry out basic mathematical operations involving ratios, proportions, percentages and reciprocals; | utilising conversion factors, equations, tables and graphs;<br>✓ Comply with the mathematical rules when dealing with the perimeter, circumference, area or volume of a given object;<br>✓ Carry out tasks in calculating the perimeter, circumference, area and volume of various simple two and three dimensional profiles. |

**Module Assessment**: The assessment paper will be divided into 1 section:

- Section A – Calculations, which all need to be answered

The duration of this assessment is of 90 minutes and the pass mark is that of 45%.

Module 2 Learning Outcomes- **Mathematics II**

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| ✓ Carry out basic arithmetic operations utilising algebraic expressions and fractional algebraic expressions;<br>✓ Carry out calculations to find the square roots of numbers and associated applications;<br>✓ Carry out basic arithmetic operations utilising algebraic expressions containing exponents;<br>✓ Carry out basic arithmetic operations to solve linear equations and correctly transpose formulae;<br>✓ Ensure that drawings comply with the properties of different angles where applicable;<br>✓ Carry out geometric exercises that correctly utilise the properties of angles in circles and polygons; | ✓ Comply with the characteristics of the trigonometric functions of sine, cosine and tangent when utilised in mathematical operations;<br>✓ Ensure that the appropriate sine, cosine or tangent functions are used to arrive at correct mathematical results Carry out mathematical operations utilising Pythagoras' theorem;<br>✓ Produce a coordinates table for a graph plot as derived from a given equation;<br>✓ Create accurate graphs by plotting coordinates in all four quadrants of the Cartesian Plane;<br>✓ Deal with the accurate interpretation of a plan' up/down scaling calculations and correctly transpose measurements onto a given site. |

**Module Assessment**: The assessment paper will be divided into 1 section:

- Section A – Calculations, which all need to be answered

The duration of this assessment is of 120 minutes and the pass mark is that of 45%.

Module 3 Learning Outcomes- **Physics I**

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| ✓ Advise about the energy level properties for the various states of matter;<br>✓ Carry out tasks utilising the correct standard units for mass, weight and density;<br>✓ Deal correctly with the basic principles of force and vectors | ✓ Deal correctly with the basic principles of momentum and torque;<br>✓ Comply with the first law of thermodynamics;<br>✓ Advise on the correct use of the terms heat and temperature;<br>✓ Deal correctly with thermal calculations involving the 'specific heat capacity' of matter; |

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| ✓ Carry out mathematical equations in accordance with the basic laws of motion;<br>✓ Carry out measuring tasks using suitable measuring instruments, in order to determine various dimension ranges;<br>✓ Carry out various tasks in full awareness of the Kinetic and Potential energy in a system; | ✓ Deal correctly with electrical calculations involving 'temperature coefficient of resistance';<br>✓ Carry out tasks by correctly interpreting the recommended illumination specification ranges of 'luminous intensity' for various applications;<br>✓ Deal with various electrical lighting sources that emit warm and cool light colour hues. |

**Module Assessment**: The assessment paper will be divided into 1 section:

- Section A – Calculations, which all need to be answered

The duration of this assessment is of 90 minutes and the pass mark is that of 45%.

Module 3 Learning Outcomes- **Physics II**

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| ✓ Comply with the basic principles of electricity when undertaking an electrical task;<br>✓ Ensure that one takes into account the properties of conductors and insulators when working on a given electrical task;<br>✓ Comply with the principles of resistance and capacitance when undertaking an electrical task;<br>✓ Carry out tasks using the correct electrical industry SI units and their sub/multiples;<br>✓ Deal correctly with documentation stating the electrical terminology 'voltage, current, resistance and power';<br>✓ Deal with calculations of voltage, current, resistance and power in a electrical circuit having resistors in series or in parallel or a circuit having a combination of both by transposing the appropriate electrical formulae ; | ✓ Deal with the mathematical calculations to determine the voltage drop across a circuit conductor;<br>✓ Comply with the basic principles of magnetism/electro-magnetism when undertaking an electrical task;<br>✓ Carry out tasks noting the significant differences between Direct current and Alternating current wave forms in a given electrical circuit;<br>✓ Carry out calculations of Root Mean Square and Average Values of electrical parameters, which are typically used in the trade. |

**Module Assessment**: The assessment paper will be divided into 1 section:

- Section A – Calculations, which all need to be answered

The duration of this assessment is of 120 minutes and the pass mark is that of 45%.

The Malta Further and Higher Education Authority (MFHEA) deems this certificate to be at Level 2 of the Malta Qualifications Framework and the European Qualifications Framework for Lifelong Learning. This course comprises study modules to which a total of 6 ECTS points are assigned.