

FOUNDATION DEGREE IN MARINE ELECTRICAL ENGINEERING

OVERVIEW

This programme is a three year sandwich course that has been designed to enable marine cadets to achieve the academic standard necessary for the qualification of Foundation Degree in Marine Electrical Engineering and the STCW approved certificate as Electro-technical Officer (Operational).

More about this programme

The main deliverable objective of this award is to provide the academic or underpinning knowledge required by practising Electro-Technical Officers within today's maritime industries. The programme strategy mirrors the established and accepted practice of integrating the practical and theoretical elements to provide a programme that corresponds with existing engineering training programmes.

The initial knowledge and skills delivered within level 4 will enable the range of knowledge anticipated at entry to be developed to allow application of skills on-board ship. This knowledge will be developed within the level 5 modules delivered in the final two semesters. The college based programmes are fully integrated with industrial or sea based training that meet the industry's requirements for a structured and phased training scheme. During the sea phases students will undertake work based learning that is supported during the college based phases, as well as completing a sea phase record book of practical training undertaken on-board.

Modular structure

Engineering Mathematics; Marine Operations; Electronic Principles and Control; Engineering Science; Work Based Learning and Operational Management; Electrical Principles and Power; Electrical Plant Operation; Electrical and Electronic Principles; Radio Communication; Marine Control Systems; Marine Navigation Systems; Engineering Project

ENTRY REQUIREMENTS

Either: A UCAS tariff of 48, including 12 UCAS points from a Maths and/or Science subject;

plus GCSE (or equivalent as approved by the College) grade 4 / Grade 'C' or above in all the following subjects:

Mathematics

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Science

English language

Or: Successful completion of our engineering pre-cadetship programme - <https://www.stc.ac.uk/marine-school/course/pre-cadetship-engineering>

Candidates will also be required to secure sponsorship from a shipping company who will provide the industrial placements on-board ship.

ASSESSMENT

ST41 - engineering mathematics

This module provides learners with most of the mathematics content required for other modules of their programme. It will review previous learning from school or college and give new input of topics within the field of Engineering Mathematics. Students will learn about various concepts in algebra, including manipulating partial fractions and solving equations. They will study the properties of the trigonometric and hyperbolic functions and their graphs. There will be an introduction to calculus and the main applications of differentiation and integration. Learners will learn about arithmetic of complex numbers in both rectangular and polar form. There will be a general introduction to matrices and their properties, and also to the Laplace transform.

ST42 - marine operations

The module introduces shipboard operations with emphasis on health and safety, and pollution prevention. This will include applications of risk management techniques in the context of risks to life, property and marine engineering activities.

ST43 - electronic principles and control

The module introduces a range of analogue and digital devices and techniques required for the understanding of electronic equipment e.g. radio communication equipment, radar, ARPA and other electronic navigational aids. It provides the student with the preliminary knowledge and understanding of the requirements for the ENEM and GMDSS Radio Maintenance Certificates.

The module introduces the fundamentals of instrumentation, describing different methods and how this leads to control systems found on board ships. The learner should become capable of investigating instrumentation and control systems to assess their accuracy and reliability for purpose.

The module assumes a working knowledge of basic electrical concepts and elementary network theory. The module introduces a range of analogue and digital devices and techniques required for the understanding of electronic equipment.

ST45 - work-based learning and operational management

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- Introduce candidates to the management of shipboard operations, personnel and resources associated with the management of a vessel.
- Allow learners to investigate a number of topics during their sea phase training. Learners will be directed to ship specific investigations directly pertaining to their intended experiences and knowledge requirements.

ST47 - electrical principles and power

The module introduces the electrical principles which are fundamental to the design, operation and fault analysis of electrical engineering systems. AC and DC theory, instrumentation and control and three phase systems will be explored. Power electronics, an important area of marine engineering. This module develops the understanding of modern motor control devices and methods, motor controllers and the safe techniques for measuring electrical quantities. The focus is on practical aspects of power control rather than the details of electronic control and firing circuits. This module develops the understanding of Ship propulsion system.

ST48 - marine science

The module introduces the mechanical and thermodynamic scientific principles that underpin the design and operation of engineering systems. It provides the knowledge and understanding of engineering systems in preparation for further study in specialist areas of engineering.

Upon successful completion of this module, students will have demonstrated:

- How to apply the fundamental principles of mechanics, thermodynamics, stability, and ship construction.
- Identify and analyse simple applied problems involving static engineering systems, dynamic engineering systems, thermodynamics, stability, and ship construction.

ST51 - electrical plant operation

The module introduces aspects of safety in relation to marine low and high voltage systems, and the need to understand explosion protected electrical equipment for use in flammable atmospheres.

Upon successful completion of this module, students will have demonstrated:

- Electrical Power Distribution and Protection
- Boiler safety equipment and test procedures
- Electrical Equipment for Hazardous Areas
- Safety, Fault Finding and Maintenance

ST53 - electrical and electronic principles

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The module further develops and deepens learners' understanding of electrical and electronic principles. This module investigates the effects of harmonics and the use of harmonic filters.

Upon successful completion of this module, students will have demonstrated the ability to:

- calculate the changes in current, voltage and power levels at components level within the system;
- apply engineering principles to the solution of problems relating to a marine electrical/electronic engineering environment.

ST56 - radio communication

The module develops the students' ability to appraise a range of radio communication systems to determine optimum operational parameters and to evaluate the design of various electronic communication systems and to propose modifications and improvements to system designs.

Students will gain experience of comparing theoretical calculations with experimental results.

ST57 - marine control systems

The module is a vehicle to extend the learner beyond the understanding/techniques acquired through the level 4 module of Instrumentation and Control. Previous ideas will be reviewed and then manipulation of feedback systems using mathematical analysis will be developed.

This unit contains the basic mathematical techniques used to manipulate Laplace Transform and their inverses and coverage of the fundamental methods for analysing control systems and applies them to the design of shipboard systems. Particular attention is given to real systems and the approximations and assumptions necessary to analyse them. A descriptive treatment of computer-based controllers and measurement data collection systems gives an appreciation of how they can be used to implement more complex situations.

The learner will apply newly acquired knowledge to case studies and receive formal assessment by way of assignment and examination.

ST58 - marine navigation systems

The module investigates marine electronic equipment and introduces a structured approach to fault diagnosis. It will emphasise the importance of carrying out comprehensive performance checks, and analysing the information gained against a knowledge of the system operation, prior to carrying out more specialist tests to locate the fault to sub-system, board or component level.

ST59 - engineering project

The module develops the learners' ability to use the knowledge and skills they develop at work and on the academic programme to complete a realistic work-based project. It provides an opportunity for the learner to integrate and apply the skills and knowledge developed in the other modules of the programme within a major piece of work that reflects the type of performance expected of an Incorporated Engineer.

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The module will be delivered via a combination of lectures and directed and independent learning. Assessment consists of coursework and a presentation. The coursework will be an individual written project. The student will receive formative feedback in the lectures on problem solving tasks.

PROFESSIONAL OPPORTUNITIES

The awarding body is University of Sunderland.

Successful completion of this programme gives entry onto B.Eng (Hons) programme at the University of Sunderland.

FURTHER INFORMATION

Covid-19 has challenged the delivery of professional programmes, but here at South Shields Marine School we have developed our professional standards for academic delivery with an effective approach to your programme of study which includes safe face-to-face teaching. This involves careful timetabling to dedicate each group (bubble) to a single classroom to prevent excessive movement and contact with others. Hand sanitiser and face coverings (masks) will be provided. Start times, coffee breaks, lunch and end times will be staggered as far as possible. Classroom windows will be open to increase fresh air flow.

Should there be a re-introduction of restrictions by the Government then we are also prepared to continue to deliver your programmes remotely.

The Curriculum Leaders remain active and will be meeting you during the first week to say hello, along with all of the lecturing team who will guide your learning and help with your assessments.

In the coming months before commencing your studies please contact the marine administration office if we can offer any further guidance before joining us:

Sam Morgan or Lucy Howlett for engineer / eto cadet enquiries:

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DATES & FEES

Contact us for current course dates and fees.

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