LLOYD'S MARITIME ACADEMY

DIPLOMA IN NAVAL ARCHITECTURE

Explore and expand upon fundamental naval architecture knowledge - training course by tutored distance learning

Assessed and Awarded by

NKC NORTH KENT COLLEGE

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DIPLOMA IN NAVAL ARCHITECTURE
ABOUT THIS COURSE

Our Diploma in Naval Architecture will dig into all the technical, mathematical and practical aspects of a ship's design. You will learn from industry experts who are here to guide and support students through all the required topics - no bulkhead will be unchecked, no metacentre left unbalanced, and no rudder unturned.

For those who are aiming towards a degree in Naval Architecture this course will provide a smooth transition to that level.

Course highlights:

- Delivered by experts in the field – Course Director: **Allan Larsen**
- Duration: **12 Months**
- Delivery: **Online with support from leading industry experts**
- Award: **Diploma in Naval Architecture**

Ideal for:

If you are looking for a solid understanding of ship design, construction, repair, modification, stability and operation of vessels and other floating structures within the marine environment, our course has you covered.

- Engineers who would benefit from a knowledge of the concepts underlying ship construction
- Shipyard and dry dock personnel who need to understand the role of naval architecture in ship construction and repair
- Project managers, consultants, surveyors, and allied roles who need to develop their theoretical and practical knowledge of ship design and construction
- Legal, regulatory and insurance professionals from Classification Societies, P&I Clubs, Maritime Authorities and Flag States needing to develop their understanding of naval architecture
- Other associated roles, such as sales and marketing, commercial managers, estimators and purchasing personnel who would benefit from a greater knowledge of ship design and construction for their roles

DIPLOMA IN NAVAL ARCHITECTURE
OUTCOMES

What You Will Learn:

1. How naval architecture interacts and combines with other mechanical engineering disciplines
2. The concepts related to the ship's equilibrium and the factors affecting it
3. A working knowledge of elements of stability assessments both at small angles and large angles
4. Different forces acting on the ship during movement and what the overall interaction with environment is
5. Definition of screw propeller geometry and how this geometry will affect torque and thrust
6. The types of ship's oscillations and their modelling for 'still water' conditions
7. The impact of environment elements on the ship in the context of the ship's design
8. The concepts of mathematical modelling with regards to Finite Element Analysis (FEA)
9. Definition of the various design stages and elements within the ship design process flow
10. The nomenclature of the structural elements, with particular regard to loading d structural arrangements

WHY NOT STUDY WITH A COLLEAGUE?

GROUP BOOKINGS MAY QUALIFY FOR A DISCOUNTED ENROLMENT FEE.
CLICK HERE TO FIND OUT MORE.

DIPLOMA IN NAVAL ARCHITECTURE
COURSE LEADERS

Course Director - Allan Larsen

Led by Allan Larsen, a Chartered Engineer and Chartered Marine Engineer with over thirty years of marine industry experience. Allan is registered with FEANI, The Engineering Council, RINA, IMarEST and the Society of Consulting Marine Engineers and Ships Surveyors.

Of his career, Allan served fifteen years with the major Classification Society Bureau Veritas acting as a ship surveyor (all marks and all notations) and as Head of Section for Casualties, Damages and Repairs. Allan has also achieved certification in many auditing systems including ISO9001,ILO-MLC, ISM,ISPS, ISO 50001, BS18000 and BS 14000.

Currently, Allan is the Managing Director and Principal Surveyor at 'Larsens Marine Surveyors & Consultants Ltd' serving the maritime insurance, legal, training and recreation sectors of the marine industry. Allan is also currently President of the Society of Consulting Marine Engineers & Ship Surveyors (SCMS).

"This course is a great addition to our international portfolio. The subject of Naval Architecture is in many respects not a new science, but it's value in the marine industry is as important today as it ever has been. In fact, as the marine industry strives for ever more efficient vessels and reduced financial and environmental impact from the production, operation and decommissioning of these, the subject of Naval Architecture must continue to rise to new challenges as well as utilise tried and tested calculations and construction methods."

Allan Larsen, Course Director,
Diploma in Naval Architecture

How You Will Learn:

Every course is broken down into manageable modules, designed to accelerate your learning process throughdiverse learning activities:

- Work through your instructional material online
- Interact with your peers and learning facilitators through the online forum to discuss subject related issues and to network with your fellow learners
- Investigate relevant, real-world case studies
- Apply what you learn each week to ongoing Tutor Marked Assignments

KEY INFORMATION

When does it start and how long is the course?

The course is 12 months long and the modules are released online, one every month. Please go online to see the next available start date.

What are the entry requirements?

Participants should be able to prove a minimum achievement of A-Level or equivalent (High School) or those who demonstrate a number of years of relevant industry experience are welcome to apply. You must have an adequate command of English in order to meet the demands of the course. Participants are recommended to have completed study of mathematics to a high school level before enrolling for this course.

How is the course assessed?

The course is assessed through written course work comprising of 3 Tutor Marked Assignments delivered at intervals throughout the programme and a final Case Study. Written assignments are submitted online, and written feedback is provided by the marker.

How much does it cost?

Please go online to
www.lloydsmaritimeacademy.com/dna
and see the Fees page for full details.
An interest-free instalment plan is available.
Please contact us for more details.

NAVAL ARCHITECTURE IN THE 21ST CENTURY

Module 1

The first module provides a thorough introduction to the course and familiarises students with the key concepts of naval architecture, its history and future development. Definitions used within naval architecture are explained, ship geometry is defined and explained and working examples are utilised to explain the rationale for underlying concepts.

Learning Outcomes:

- Develop an appreciation and understanding of concepts within naval architecture
- List the concepts involved in defining the ship's geometry
- Calculate a ship's various aspects related to its geometry
- Explain how naval architecture interacts and combines with other mechanical engineering disciplines

Indicative Structure:

- Introduction to the Course
- Introduction to the Module
- Definition of naval architecture, its history, recent developments and principal areas of knowledge
- Role of the naval architect
- Mechanical engineering tools, including fluid mechanics
- General mathematical concepts used in naval architecture
- The geometry of the ship
  - Ship's main particulars
  - Coefficients of fineness
  - Displacement and weight
  - Tonnage
  - Nomenclature and notation
  - Units
- The ship's buoyancy
- The ship's bodylines and table of offsets

APPLICATION OF HYDROSTATICS

Module 2

Building on module one, this module develops student's understanding of hydrostatics, the need for it, the concepts used, and the laws which governs their limitations.

Learning Outcomes:

- Apply the laws which governs hydrostatics, and the mathematical modelling used
- Define the forces that a floating structure is subject to
- Develop working knowledge in calculating various hydrostatics elements
- Assess various hydrostatics elements required by marine engineers
- Describe the concepts related to the ship's equilibrium and the factors affecting it

Indicative Structure:

- General concept of hydrostatics
- The forces acting on a liquid, including Archimedes Law and the concept of density
- Hydrostatics elements, including the idea of floatability
- Types of ship's waterlines
- Weight, displacement, deadweight, tonnage, TPC, calculations

SHIP STABILITY AND TRIM

Module 3

This module develops an understanding of stability with examination of the concepts used, the elements of stability, assessment of stability and the laws which govern it.

Learning Outcomes:

- Apply the concept of ship stability and the elements influencing stability
- Develop a working knowledge of elements of stability assessments both at small angles and large angles
- Utilise methods in assessing damaged stability
- Explain the role ship's subdivision plays in naval architecture

Indicative Structure:

- The stability of the ship at small angles
  - Centre of buoyancy
  - Metacentres
  - Free surface effect of bunkers, stores an wet cargo
  - Effect on stability of solid bulk cargo liquefaction
- Weights embarkation/debarkation
- The stability of the ship at large angles
  - Static and dynamic stability
  - The static stability diagram
- Damage stability
  - Ship's subdivision

SHIP HYDRODYNAMICS

Module 4

This module develops the student's knowledge related to the ship's propulsion. The module re-explores the concepts and tools of fluid mechanics and explain the criteria and means of experimental assessment of propulsion using models. It then continues by explaining and developing concepts such as drag, and the interaction in between the ship and waves.

Learning Outcomes:

- Apply the concepts of fluid mechanics in the modelling of the drag component
- Explain what forces are acting on the ship during movement and what the overall interaction with environment is
- Use the appropriate tools in the assessment of the ship's propulsion
- Describe the constraints of the ship navigating in certain areas

Indicative Structure:

- General hydrodynamic tools
  - Proprieties of liquids
  - Bernoulli equation and theory
  - Wave theory
- The ship's propulsion
  - The main components of drag
  - Total drag estimation

SHIP'S PROPELLERS, RUDDERS AND MANOEUVRABILITY

Module 5

Concepts behind propulsion and manoeuvrability are explored with explanations of the fundamentals of the screw propeller's geometry and rudders. The module addresses mathematical modelling, and its related thrust and torque as well as the experimental methods used in relation to the theory of similitude in screw propeller efficiency assessment and hull-propeller interaction. The module ends with an examination of the geometry of the rudder and its impact on the ship's movement, and the forces that rudders are subject to.

Learning Outcomes:

- Explain the principle of screw propeller functioning
- Define screw propeller geometry and how this geometry will affect torque and thrust
- Establish basic screw propeller design parameters
- Apply concepts relating to rudders geometry and the forces acting on the rudder in ship design
- Explain how the hull/rudder interaction achieves movement in a certain direction

Indicative Structure:

- Propellers and manoeuvrability
- Screw propeller geometry
  - Screw propeller blades
  - Blade geometry (avoiding singing and vibration)
  - Ideal propeller theory
  - Blade element theory
  - Thrust, torque and screw propeller efficiency
- Hull-propeller interaction
  - Wake
  - Suction
  - Hull's influence
  - Propulsive efficiency
  - Hull squat
- Rudder hydrodynamics
  - Rudders
  - Types of rudders
  - Rudder geometry
  - Rudder positioning
  - The forces and moments acting on rudders
  - Rudder construction

SEAKEEPING QUALITIES

Module 6

This module examines the ship's motions and environmental impact. The module also describes the ship's oscillational elements both in still water and in waves, developing the mathematical model of the ship's motions.

Learning Outcomes:

- List the fundamental types of motions applicable to ships
- Explain the types of ship's oscillations and their modelling for 'still water' conditions
- Apply the concepts of the forces and moments acting on the ship on waves in ship design

Indicative Structure:

- Motions of the ship
  - Rolling
  - Pitching
  - Heave
  - Yaw
  - Sway
  - Surge
  - Slamming (including stern slamming)
- Ship's oscillations
  - Transversal oscillations
  - Longitudinal oscillations
  - Vertical oscillations
  - Whipping and springing
- The forces and moments acting on the ship
  - Differential equations of the motions
  - Calculation of the longitudinal vertical equations
  - Influence of direction and speed on oscillation in waves
- Parametric roll

THE WORKING ENVIRONMENT, DESIGN BASE AND SHIP PERFORMANCE

Module 7

The module investigates the environment in which the ship operates, as well as the associated design constraints and requirements.

Learning Outcomes:

- Describe the environment constraints related to the ship's operation at the boundary of two fluids
- Utilise the impact of environment elements on the ship in the context of the ship's design
- Apply an understanding of the regulatory framework to limit the ship's operating impact on environment

Indicative Structure:

- Sea, air and wind as the ship's working environment
  - Sea
  - Air and Wind
  - Waves
  - Other Environmental Factors
  - Sea Ice
- Ship Operation
- Protection of the marine environment
  - IMO Measures to Prevent Pollution of the Marine Environment
  - The Ship Energy Efficiency Design Index (EEDI)
  - Protection of the Ship in the Marine Environment

THE SHIP AND MARINE STRUCTURES

Module 8

The module explores the structural, design and structural assessment of the ship and other marine structures. It explores the Theory of Solid Body which is used in the mathematical modelling of loads induced by environment elements and the ship's or marine structure response to them.

Learning Outcomes:

- Apply the basic outcomes of the Theory of Solid Body with regards to ship design
- Apply the concepts of mathematical modelling with regards to Finite Element Analysis (FEA)
- Apply the concepts used in the assessment of steel structures under various loads
- Describe the requirements of goal-based design
- Determine and apply mathematical modelling of the ship on water, both in 'still water' and dynamic on wave modes
- Develop working knowledge of the structural assessment of the ship

Indicative Structure:

- The theory of structures
  - Physical and geometrical model of the materials
  - Deformability displacements and deformations
  - Internal forces tensions and loads
  - General elasticity equations
  - Variational principles applied in theory of elasticity
- Finite Element Theory
- Loads acting on the ship
- Structural strength (longitudinal and transverse)
- Design loads
- Structural design
- The hull structure and equivalent girder
- Vertical hull-girder strength

SHIP DESIGN PROCESS

Module 9

The module explains fundamental concepts with regards to the ship's design, emphasising the elements of the ship's design process flow. The module also familiarises students with the role of classification societies with regards to naval architecture concepts.

Learning Outcomes:

- List and map the various design stages and elements within the ship design process flow
- Apply computer aided design to the ship design process
- Realise the varied aspects to consider when designing a ship
- Define the classification of ships followings various scopes

Indicative Structure:

- Design stages
- The design process
- General arrangement (GA) drawings
- Computers and computer-aided design and manufacture (CAD/CAM)
- Specifications
- Model tests
- Layout
- Human factors
- The internal environment
- Different ship types
- Merchant ships
- Special service craft

SHIP CONSTRUCTION

Module 10

The final module explores the structural arrangements of ships and floating structures following their scopes and specification. Within the module students will become familiarised with the ship's structural nomenclature. Key elements related to material science and welding will also be explained.

Learning Outcomes:

- Define the nomenclature of the structural elements, with particular regard to loading and structural arrangements
- Apply systems of structural framing, following the ship's scope and specifications
- Describe the construction of the ship's structure
- Discuss the specific construction aspects of various merchant ships

Indicative Structure:

- The ship's structural elements nomenclature
- The systems of structural framing
- The ship's structure construction
- Constructive specifics of commercial vessels
  - General cargo ships
  - Tankers
  - LNG vessels
  - Specialized ships
  - Bulk carriers
  - Container ships
  - RO/RO ships
  - Fishing ships, trawlers and fish-processing factories
  - Reefer ships
  - Ice breakers
  - Tugs
  - Cruise ships
  - Catamarans and trimarans

LLOYD'S MARITIME ACADEMY

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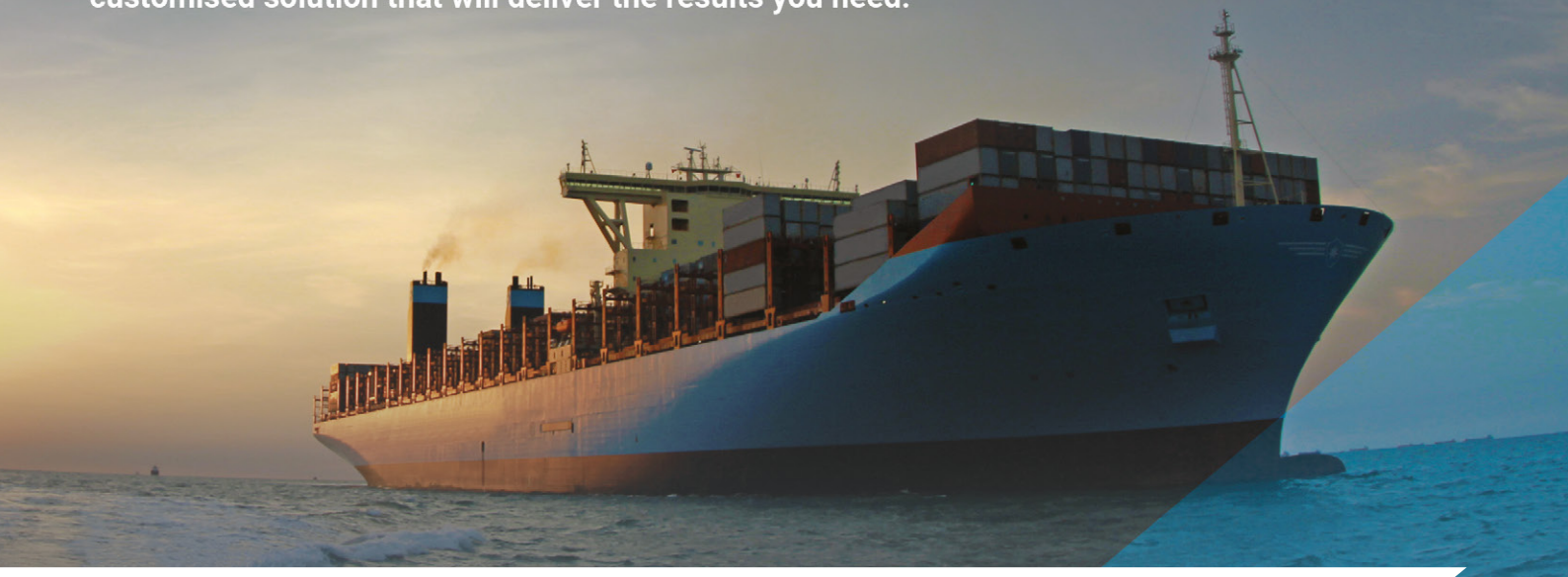

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LLOYD'S MARITIME ACADEMY

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DIPLOMA IN NAVAL ARCHITECTURE
WHO WE ARE

LLOYD'S MARITIME ACADEMY

ABOUT LLOYD'S MARITIME ACADEMY

Lloyd's Maritime Academy was born from Lloyd's List.

Lloyd's Maritime Academy is the trusted brand for professional development, working with leading academic and industry bodies to provide accredited education and training where it is much needed.

We are stepping up investment in new learning management platforms, improved content and learner resources to enhance your experience and ensure maximum reward for the investment you make in your future.

We continue to research new topics to provide you with the qualifications needed for a successful career; supporting a safer, cleaner and more efficient shipping industry for decades to come.

We look forward to welcoming you onto one of our programmes.

WHY TAKE A LLOYD'S MARITIME ACADEMY COURSE?

- **Accessible** – 24/7 availability from wherever you have an internet connection
- **Flexible** – take control of where, when, how and the rate at which you study
- **Professional** – industry leading course directors and tutors
- **Quality** – study the same course used by corporations for internal training
- **Network** – with tutors and like-minded professionals from around the world. Use our online tutorial forum to ask questions and share knowledge
- **Save money** – no additional travel or accommodation costs

NKC NORTH KENT COLLEGE

ASSESSED AND AWARDED BY NORTH KENT COLLEGE

North Kent College is a major UK college based on the River Thames providing further and higher education in the south east of England. The College caters for more than 4,500 students across two main campuses, with a wide variety of academic and vocational courses, as well as professional education and training via short courses, part-time study or distance learning. Full-time and part-time higher education programmes and foundation degrees are delivered via a partnership with the University of Greenwich.

The National Maritime Training Centre at North Kent College is widely recognised within the maritime industry for providing sector-specific training within high quality industry-standard facilities.

The College is committed to helping students to achieve their ambition – whether they wish to gain their first job, achieve high-level professional qualifications, change career or prepare for their next promotion. The College takes pride in working in partnership with industry to provide the correct mix of knowledge and practical skills that are required to sustain the workforce.

North Kent College is a partner of Lloyd's Maritime Academy in delivering this course and manages assessment, quality assurance and the award of the professional development Diploma.

www.northkent.ac.uk/nmtc

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NKC NORTH KENT COLLEGE

LLOYD'S MARITIME ACADEMY

CLICK HERE TO REGISTER NOW

If you have any questions about the course or applying, please contact us on:

www.lloydsmaritimeacademy.com/dna

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