



Programme syllabus

Master's Programme, Maritime Engineering, 120 credits

Masterprogram, marinteknik

120.0 credits

Valid for students admitted to the education from autumn 16 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

The Nordic Master Programme in Maritime Engineering is given in collaboration between the Nordic Five Tech Universities – KTH (Sweden), Chalmers (Sweden), DTU (Denmark), Aalto (Finland), and NTNU (Norway)– and hereby combines these five universities' lead expertise and long tradition in maritime engineering. Students begin their studies in this programme at one of the partner universities for year one, and complete their studies at another university for year two, resulting in a double degree from the two universities. As an engineer graduated from this programme you will possess a deep theoretical knowledge of topics such as waves and wave loads; the interaction between water and structures; stability and dynamics of ships, small craft and platforms; propulsion; and advanced steel and lightweight structures. You will also have a high level of knowledge and experience of the design, construction and operation of ships, small craft and offshore structures, including technical as well as economic, social, and environmental aspects. The multi-disciplinary character of the subject maritime engineering, and the structure and curriculum of this program, make the education relevant for careers in the maritime sector as well as in other fields.

Knowledge and understanding

A Master of Science in Maritime Engineering will:

- have the knowledge and understanding of the topic enough to be employable as a Naval Architect and in other fields of engineering in Sweden and internationally,
- possess a systems perspective on engineering,
- have confidence in hers/his base of engineering fundamentals,
- be aware of the general professional conditions in the industry,
- be familiar with the needs and conditions for sustainable development.

Skills and abilities

A Master of Science in Maritime Engineering will:

- have the ability to independently and creatively formulate and critically and systematically handle and analyze complex problems and situations, using relevant modern methods and tools,
- have the ability to *Conceive, Design, Implement* and *Operate* boats, ships and complex value-added naval systems in modern team-based environments,
- have the ability to, both orally and in writing, communicate and discuss conclusions and the underlying theory and argumentation,
- have good individual and group interactions abilities, such as, teamwork, leadership, and communication skills,
- be able to follow and participate in research and development work in the field of naval architecture.

Ability to make judgements and adopt a standpoint

A Master of Science in Maritime Engineering will:

- have the ability to in the field of naval architecture make decisions regarding research and development work based on relevant scientific, societal and ethical aspects,
- show insight regarding the possibilities and limitations of engineering science and its role in the society,
- have ability to identify the need for further knowledge in the field and take responsibility for keeping their personal knowledge up to date.

Complete information on the degree requirements can be found at the local degree policy of KTH, see <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227>

Extent and content of the programme

The Nordic master program in Maritime Engineering is a two-year (120 university credits) master program on the advanced level (second cycle) starting every year in late August. The instruction language is English. The programme is structured in two parts:

1. In the first year, focus is on general maritime engineering topics and naval architecture on Master level: stability, resistance and propulsion, seakeeping, manoeuvring and ship and ocean structures.
2. In the second year, students specialize in one of the five study tracks: *Ocean Structures (NTNU)*, *Passenger Ships (Aalto)*, *Ship Design (Chalmers)*, *Ship Operations (DTU)*, *Small Craft (KTH)*. Some more information on the tracks is given in Appendix A.

It is thus required that the student starts at one of the partner universities for year 1 and finish the studies at another university for year 2. A student starting at KTH may not take the KTH study track during year 2.

Eligibility and selection

Basic eligibility requirements

A completed Bachelor's degree, corresponding to a Swedish Bachelor's degree (180 ECTS), or equivalent academic qualifications from an internationally recognised university.

English language proficiency equivalent to (the Swedish upper secondary school) English course B /6. There are different ways to fulfill the English language requirements, see: www.kth.se

Specific eligibility requirements

A BSc in Naval Architecture is required. The following alternative degrees might however be considered on an individual basis:

- BSc in Ocean Engineering, Vehicle Engineering, Mechanical Engineering, Civil Engineering or Engineering Physics.
- BEng in Naval Architecture, Ocean Engineering or Mechanical Engineering.

The applicant's qualifications must include a strong working knowledge of mathematics and mechanics fulfilling the following minimum requirements:

- Mathematics: 25 ECTS including linear algebra, calculus and differential equations.
- Statistics and probability theory: 5 ECTS.
- Statics, mechanical vibrations, and strength of materials: 10-15 ECTS
- Fluid mechanics: min. 5 ECTS

A qualification checklist for this documentation to be attached to your application can be found here:

http://www.nor-mar-eng.org/~media/Sites/NOR-MAR-ENG/Qualifications_checklist.ashx

Moreover, the applicant must have sufficient qualifications within numerical methods and elementary programming using e.g. MATLAB or a similar programming language.

The specific requirements may be assessed as not fulfilled if the grade point average is below 75 % of the scale maximum.

Selection process

The selection process is based on the following selection criteria: University, previous studies (for instance GPA), motivation for the studies (for instance letter of motivation, references).

The evaluation scale is 1-75.

All applications are academically evaluated by the consortium partner universities. Admission is based on joint decision by the admission board of the consortium. There is a maximum in the number of students admitted to each university and to each study track. The maxima are decided by the admission board. For this reason applicants may apply for more than one study track/university combination and should state their priority in their letter of motivation. In the letter of motivation you should very briefly explain your background and your motivation for studying maritime engineering, including the study track you have selected. You must also clearly indicate the study track that you wish to do. If you send more than one application you should use the same letter of motivation, and in this case give priority to the combinations of study track and start university that you wish to do. Qualified students who are not admitted to their first priority combination may be offered their second priority combination.

Implementation of the education

Structure of the education

The academic year at KTH is divided into four periods. Each period lasts approximately seven weeks with at least 33 days of study. Each period is followed by an exam period. In addition to the four regular exam periods, there are three additional re-examination periods: after Christmas, after May and immediately preceding the first study period of the academic year. The academic year has a duration of 40 weeks. Teaching activities may, if necessary, be scheduled outside the academic year. The first three quarters of the program (90 university credits) is course based, while the last half year (30 university credits) is devoted to the degree project.

Courses

The programme is course-based. Lists of courses are included in [appendix 1](#).

Grading system

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

The grades pass (P) and fail (F) are used thesis works.

Conditions for participation in the programme

Course application

All programme students apply for courses 1-15 November/1-15 May for the next semester. The application is done via universityadmissions.se

Semester registration

Everyone admitted to an educational programme at KTH must register for the semesters they intend to study. Semester registration is a prerequisite and is required for the registration and reporting of results on courses. You can carry out a web registration at the same time as the semester starts, provided that you have fulfilled requirements for the coming semester.

Semesterregistration is done by the “personal menu” at www.kth.se

Recognition of previous academic studies

Under certain circumstances, and in agreement with the program director, credits for previous studies can be received according to the local policy of KTH, see <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer/1.27200>

Studies abroad

After approval by the programme director, part of the studies may be carried out abroad (including the Master's degree project). The condition is that the parts of the programme carried out abroad should fit in with the educational programme.

Degree project

A 30-credit Master's degree project is carried out at the end of the educational programme (usually the fourth semester). The purpose of the project is to let the student study a problem in more depth than is possible in the courses. The project may be carried out in an academic or industrial environment in Sweden or abroad. To be allowed to start a degree project, a student must have accumulated at least 60 credits.

The choice of project must be approved by the programme director.

The Degree project is graded with P/F.

Degree

In order to earn a Degree of Master of Science, passing grades in all courses which are included in the student's study plan are required. The study plan must comprise 120 higher education credits which include a degree project consisting of 30 higher education credits, in the second cycle.

KTH's local degree ordinance can be found at KTH's website, www.kth.se.

Application for degree certificate

When the studies at KTH are completed a degree certificate can be applied for.

Application is done by the "personal menu" at www.kth.se

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)



Appendix 1: Course list

Master's Programme, Maritime Engineering, 120 credits (TMEGM),
Programme syllabus for studies starting in autumn 2016

General courses

Year 1

Mandatory courses (34.0 Credits)

Course code	Course name	Credits	Edu. level
SD2711	Small Craft Design	10.0 hp	Second cycle
SD2721	Ship Design	9.0 hp	Second cycle
SD2722	Marine Structures	7.5 hp	Second cycle
SD2723	Marine Hydromechanics	7.5 hp	Second cycle

Optional courses

Course code	Course name	Credits	Edu. level
AK2030	Theory and Methodology of Science (Natural and Technological Science)	4.5 hp	Second cycle
SD1105	Matlab	3.0 hp	First cycle
SD2411	Lightweight Structures and FEM	8.0 hp	Second cycle
SD2413	Fibre Composites - Analysis and Design	6.0 hp	Second cycle
SD2414	Fibre Composites - Materials and Manufacturing	6.0 hp	Second cycle
SD2416	Structural Optimisation and Sandwich Design	6.0 hp	Second cycle
SD2724	Minor Marine Technology Project	3.0 hp	Second cycle
SG2212	Computational Fluid Dynamics	7.5 hp	Second cycle
SG2224	Applied Computational Fluid Dynamics	5.0 hp	Second cycle

Track, Ocean Structures (MEGA)

Track, Passenger Ships (MEGB)

Track, Ship Design (MEGC)

Track, Ship Operations (MEGD)

Track, Small Craft (MEGE)

Year 2

Mandatory courses (23.5 Credits)

Course code	Course name	Credits	Edu. level
SD2705	High-Speed Craft	6.0 hp	Second cycle
SD2709	Underwater Technology	7.5 hp	Second cycle
SD2711	Small Craft Design	10.0 hp	Second cycle

Optional courses

Course code	Course name	Credits	Edu. level
AK2030	Theory and Methodology of Science (Natural and Technological Science)	4.5 hp	Second cycle
SD2416	Structural Optimisation and Sandwich Design	6.0 hp	Second cycle
SD2724	Minor Marine Technology Project	3.0 hp	Second cycle



Appendix 2: Specialisations

Master's Programme, Maritime Engineering, 120 credits (TMEGM),
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Track, Ocean Structures (MEGA)

This study track, given at NTNU, gives you a strong foundation for design of any type of ocean structure, from conventional ships to offshore structures. It also deals with marine operations like pipelaying, towing and use of cranes on mobile platforms for installation of subsea modules. The study track is discipline based and includes groups of courses within marine environment, environmental loads, effects of loads, structural capacity and marine cybernetics.

Track, Passenger Ships (MEGB)

This study track, given at Aalto, gives comprehensive overview of the different aspects related to the design, analysis and optimization of passenger ships. The conflicting interests of various stakeholders (passenger, ship owner, shipyard) will be addressed during the studies, and you will be forced to create a solution that satisfies the stakeholder's preferences.

Track, Ship Design (MEGC)

In this study track, you will be part of a project team and work with a problem oriented and realistic ship-design project with a company from the maritime industry as the “customer”. You will be part of a student team guided by professional engineers from industry and faculty members from Chalmers. The initial design process prior to an order of a new ship is covered during the project following the demands of the customer. The project will take place during the second year and you will utilize and link together knowledge from all the marine engineering courses of the first year.

Track, Ship Operations (MEGD)

In popular terms the definition of this study track is that it mainly deals with naval architecture and maritime engineering from the point of view of the ship owner, i.e. it deals with ships at sea. You will learn to apply rational methods in analysing and optimizing the performance of ships (container ships, tankers, bulk carriers, ro-ro ships etc.) with respect to safety, efficiency, economics and environmental considerations. The track is given at DTU.

Track, Small Craft (MEGE)

In this study track you get the opportunity to apply and deepen your general maritime engineering knowledge and skills from year one, in the study of specialized craft such as high-speed craft and underwater vehicles. In team based multidisciplinary projects you will face the challenges involved in conceiving, designing, implementing and operating several different types of craft, and thereby develop your theoretical understanding, your systems thinking, and your engineering design skills.