



# Programme syllabus

Master's Programme, Maritime Engineering, 120 credits

Masterprogram, marinteknik

*120.0 credits*

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*Valid for students admitted to the education from autumn 12 (HT - Autumn term; VT - Spring term).*

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

## Programme objectives

The main objective of this program is to educate skilled engineers for industry and research institutions. The subject is multi-disciplinary with strong emphasis on systems engineering. A naval architect from the program in Maritime Engineering has knowledge about the complete processes of design, implementation and operation of marine vessels which can be very large and complex systems, as well as deep understanding in subjects such as structural and fluid mechanics and related applications. The program further gives students experience from a second university during the second year studies where specialization is done in any of the study tracks *Ocean Structures (NTNU)*, *Passenger Ships (Aalto)*, *Ship Design (Chalmers)*, *Ship Operations (DTU)*, *Small Craft (KTH)*. The education is hence relevant for students devoted to work in the maritime sector as well as for careers in other fields of engineering.

## 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 (180 ECTS) in mechanical engineering or Naval architecture, from a university recognized by government or accredited by other recognized organization.

### *Specific eligibility requirements*

Applicants with a BEng in Naval Architecture, or a BSc or BEng in Naval Architecture and Marine Engineering, in Ocean Engineering, in Civil Engineering or in Engineering Physics will be considered on an individual basis. The applicant's qualifications must include a strong working knowledge of mathematics and mechanics and applicants must document that they have fulfilled 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

### *Selection process*

The selection process is based on a total evaluation of the following criteria: University, Grade Point Average (GPA), and motivation letter. Courses on relevant topics such as fluid mechanics, structure mechanics, complex analysis, partial differential equations, and control theory are considered an additional qualification. Complete information on the eligibility requirements can be found at the local admission policy of KTH, see <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning/1.27186>

## 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 proceeding 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.

### Conditions for participation in the programme

No later than November 15 and May 15 each academic year, respectively, the students are required to make a study registration and course selection for the coming term. At least 45 university credits have to be completed during the first academic year (including the re-examination period in August) in order for the student to be promoted to the second year of the program. New students have to make a decision about their *Track* in the very beginning of the program.

### 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>

### Degree project

Students admitted to the program are required to perform an independent study in the form of a thesis project corresponding to 30 university credits. Local rules for the degree project may apply depending on choice of university for year 2. Students in second year at KTH must have completed at least 60 university credits of the total course to start the project. The purpose of the thesis project is that the student should demonstrate the ability to perform independent project. More information on the KTH policy on the degree project can be found at <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/1.27212>

### Degree

Students who fulfill all the requirements will be awarded a Degree of Master of Science (two years). Students must apply for the degree and also show proof of their basic degree (Bachelor's or similar). Complete information on the degree requirements can be found in the local degree policy of KTH, see <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227>

[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 2012

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## General courses

### Year 1

#### Mandatory courses (58.5 credits)

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Course code	Course name	Credits	Edu. level
SD2411	Lightweight Structures and FEM	8.0	Second cycle
SD2703	Marine Dynamics	8.0	Second cycle
SD2706	Sailing for Performance	6.0	Second cycle
SD2707	Marine Innovation	5.0	Second cycle
SD2708	Hull Structural Design	6.0	Second cycle
SD2710	Initial Ship Design <i>For student who has not done Degree project, first level, in Naval Architecture</i>	8.0	Second cycle
SD2711	Small Craft Design	10.0	Second cycle
SG2212	Computational Fluid Dynamics	7.5	Second cycle

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#### Optional courses

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Course code	Course name	Credits	Edu. level
ME1003	Industrial Management, Basic Course	6.0	First cycle
SD2415	Process Modelling for Composite Manufacturing	6.0	Second cycle
SE1025	FEM for Engineering Applications	6.0	First cycle
SG2214	Fluid Mechanics	7.5	Second cycle

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**Year 2**

**Track, Ocean Structures (MEGA)**

**Year 1**

**Year 2**

**Track, Passenger Ships (MEGB)**

**Year 1**

**Year 2**

**Track, Ship Design (MEGC)**

**Year 1**

**Year 2**

**Track, Ship Operations (MEGD)**

**Year 1**

**Year 2**

**Track, Small Craft (MEGE)**

**Year 1**

**Year 2**

**Mandatory courses (23.0 credits)**

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<b>Course code</b>	<b>Course name</b>	<b>Credits</b>	<b>Edu. level</b>
SD2416	Structural Optimisation and Sandwich Design	6.0	Second cycle
SD2706	Sailing for Performance	6.0	Second cycle
SD2707	Marine Innovation	5.0	Second cycle
SD3705	High-speed Craft Structural Design	6.0	Third cycle

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## Appendix 2: Specialisations

Master's Programme, Maritime Engineering, 120 credits (TMEGM), Programme syllabus for studies starting in autumn 2012

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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)**

The Small Craft track, which is given at KTH, is designed to prepare you for the engineering challenges of the design and engineering of the group vessels often called small craft. The group includes fast rescue boats, patrol boats, pilot vessels and other similar vessels. Also yachts are dealt with in the track. These craft must be able to carry out their vital operations safely and efficiently during the toughest weather conditions. Also yachts must sail safely – and win their races. You will learn to apply rational methods for innovative design, including for instance advanced materials. Moreover, methods for efficient design processes and system engineering aspects related to small craft design are also taught in this track.