MT-Compass

Colofon

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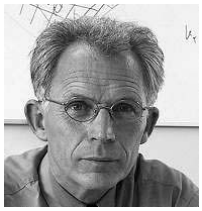

Preface

Per September 2002 Delft University of Technology has adopted the international Bachelor-Master structure for her study programmes. At the same time the international MSc study programmes have been integrated within the regular Master studies. This brochure, the MT-Compass, is the first study guide for the Master programme Marine Technology.

The MT-Compass intends to be an information brochure, which answers all questions of students with regard to the Marine Technology study programme and to make them acquainted with the Faculty of Mechanical Engineering and Marine Technology and Delft University of Technology.
The following editors have composed the guide:
Hans van Schuppen, student Marine Technology (MT),
Maarten Vriezen, student Mechanical Engineering (ME),
Nic Jan van Bemmel, manager ME and MT study programmes ,
Ewoud van Luik, manager administration for ME and MT study programmes and
undersigned.

The guide has been composed carefully, but it may happen that during the study year some changes need to be made. In those cases the most recent information can be found on the website of the faculty: http://www.wbmt.tudelft.nl.
The editors welcome suggestions to improve this guide next year. Suggestions to improve the readability or additional information could be sent to Ewoud van Luik: e.p.vanluik@wbmt.tudelft.nl

The editors hope that the MT-Compass answers all questions with regard to the educational programme and wish that all students enjoy their study with success during the examinations.

Prof. Hans Klein Woud MSc, FIMarEST
Education Director MT

Contents

1 Master of Science Marine Technology

1.1 Goal

The goal of the educational programme Marine Technology is to educate engineers Marine Technology (MSc), who have the following qualities:

- Broad and deep knowledge of the basic engineering sciences
- Broad basic technical and scientific knowledge of the Marine Technology disciplines: marine systems design, marine operations, marine hydrodynamics and structures, marine systems production
- Specialized in at least one Marine Technology discipline
- Ability to innovate, model and design marine systems
- Ability to contribute to solving multidisciplinary problems by means of a systematic approach, analysis and synthesis and to work both in multidisciplinary teams and independently in the international marine context
- Ability to communicate effectively with team members and environment
- Ethical conduct, taking responsibility with regard to sustainability, economy and social welfare
- Ability to maintain professional competence trough life-long-learning

1.2 Educational Concept and Assessment

Based on the choice of variant and specialization the master programme involves two major parts:

Lecture courses (36-48 credits)

These courses are divided in three parts:

- Compulsory part per variant (approximately 15 credit points)
- Compulsory part for the chosen specialization
- Elective part (at least 10 credit points)

For each variant and specialization these parts are described in paragraph 1.5.

The general rules for the courses within these parts are as follows:

- At least 4 credit points society oriented courses
- At least 6 credit points mathematics, physics or other fundamental Marine Techology courses.
- The student can select at least 10 credit points of courses at his own interest, in consultation with the lecturer responsible for the chosen specialization. For each variant an overview of recommended courses may be given.

Most courses are assessed by means of an oral or written examination.

Assignments (36-48 credits)

The assignments take place mainly in the second study year of the MSc-programme. In general the assignments are carried out individually.

The assignments may invdve:

- Traineeship in industry or a project task defined in consultation with an external party (industry, research institute, etc.) of 10 credit points. In case the MSc-thesis is performed in cooperation with and at the office of an external party this part of the programme may be combined with the MSc-thesis.
- Literature study
- Laboratory exercise
- MSc-Thesis (26-42 credits)

The assignments are assessed, based on a written report.
The MSc-Thesis is the final assignment in the MSc-programme. The student prepares a written report about his research or design task, performed in the assignment.
After the report has been submitted the final examination will be held. In advance of this so-called 'Ingenieurs-Examination' the student presents his work in a colloquium. The examination is held with at least three scientific staff members including the thesis supervisor. The committee may also include external examiners from industry or a research institute.
In paragraph 1.5 the requirements for assignments are specified for each variant and specialization.

1.3 Study programme and general structure

Marine Technology offers a Master of Science course of two years.
Each course year is divided in two semesters. Every semester consists of two periods. In this guide, these periods will be referred to as 1A, 1B, 2A and 2B. A period consists of seven weeks of lectures, followed by two or three weeks of tests. The student will get at least one opportunity to have a resit when a test is failed. Resits generally take place in the first period after the regular period for a certain test. Resits for the tests given in period 2B take place in the second half of August.

The credits for one study year are 42 TU Delft credit points. These credit points give an indication of the weight of a certain part of the course. One credit point involves approximately 40 hours of study. These 40 hours include all time spent on the course.
In this study guide the given credits are TU Delft credit points. One TU Delft credit point equals 1.43 ECTS credit points. One study year equals 60 ECTS credit points

1.4 Admission to the programme

There are several ways to be admitted to the MSc-programme Marine Technology. Usually the MSc-programme is a continuation of an academic BSc-programme, however the master's phase can also be entered after completing a Bachelor-programme of a polytechnic high school or the Royal Netherlands Naval College.
Admission to the MSc-programme is described in the following three subsections.

1.4.1 Academic bachelor degree

BSc-degree Marine Technology of Delft University of Technology

Every student holding a BSc-degree Marine Technology of Delft University of Technology can enter the MSc-programme without selection.
A student in the BSc-programme is permitted to do examinations of the MSc-programme, if the board of examiners approves. When the student has passed it's propaedeutic examination and has a study result of the second and third year of at least 72 credit points, including the BSc-thesis, the student is conditionally admitted to the MSc-programme. It is then possible to compose a final list of courses for approval by the board of examiners. Final admittance is granted after completing the BSc-programme.
In advance to admittance to the MSc-programme, a BSc-student may obtain approval to take part in examinations of a few MSc-courses. The student has to make a request to the board of examiners. The approval will only be given in case the student can pass for less than 8 credit points in the BSc-programme in the relevant educational period.

BSc-degree Mechanical Engineering, Civil Engineering or Aerospace Engineering

Students in this category can enter the MSc-programme without selection. In order to enter the MSc-programme additional courses have to be followed. These are courses of the BSc-programme Marine Technology and will be part of the elective courses of the chosen variant.
Courses of 48 credit points in total and assignments of 36 credit points have to be done.

This resulting programme is:

- Variant part	15 cp
- Specialization part	max. 10 cp
- Elective courses	min. 10 cp
- The next courses are additional:	
- mt517 Geometry and Stability of ships	1.5 cp
- mt215 Marine Engineering A	1.5 cp
- mt518 Resistance and Propulsion 1	1.5 cp
- mt519 Ship motions and manoeuvring 1	1 cp

- mt731	Ship Production 2	1.5 cp
- mt803	Ship Constructions 2	2.5 cp
- mtp203	Project 2-3: Design 1	3.5 cp
	Total additional courses	**13 cp**

- Assignments 36 cp

For BSc-degree Civil Engineering two more additional courses are required:

- wb2104	Systems and Control Engineering 1	2 cp
- wb1126mt	Thermodynamics 1	2 cp

This results in a MSc-programme of 88 cp instead of 84 cp.
Admission is identical as for students with a Marine Technolgy BSc-degree.

Other Academic BSc-degree Technical University

The contents of the BSc-degree and study results of each candidate will be evaluated. The intake-coordinator of the board of examiners is responsible for this selection. The selection procedure can result in:

- admission without additional requirements
- admission with additional requirements of less than 15 credit points. This case is comparable to that of BSc-degree Mechanical Engineering, Civil Engineering or Aerospace Engineering, as described above.
- admission with additional requirements between 15 and 36 credit points. In this case 15 credit points are part of the 84 cp of the regular MSc-programme and 21 credit points at most are additionally required above the regular MSc-programme.
- no admission. The candidate has to obtain the Marine Technology BSc-degree first. Within the BSc-programme exemption for some courses is possible, depending on earlier education.

1.4.2 Marine Technology Bachelor degree of Dutch polytechnic high school (TH)

A candidate can be admitted, if the candidate has completed the TH-Bachelors-programme within 4 years, with good results. An number of additional courses, of the second year of the Marine Technology BSc-programme has to be followed:

- wb1113mt	Dynamics A	2 cp
- et2019mt	Electrical ship equipment	2 cp
- mt806	Strength of materials 2	2 cp
- mt825	Introduction F.E.M.	1 cp
- wb2104	Systems and control Engineering 1	2 cp
- wi2256th	Linear algebra for TH-students	4 cp
- wi1147th	Analysis for TH-students	6 cp
	Total:	**19 cp**

These additional requirements will ensure that the student has at least an entrance level comparable to the second-course year of the Marine Technology BSc-programme. The lecturer of the chosen variant and specialization may require that also a number of third year courses of the BSc-programme, in the field of the specialization is followed. In the MSc-programme the student gets exemption for the traineeship (10 cp).

In total this results in a study programme of 19 + 84 –10 = 93 cp.

1.4.3 Dutch Bachelor degree of "Hogere Zeevaartschool"

Procedure similar to that of Polytechnic high school as mentioned above. The following additional courses need to be done:

-	wb1113mt	Dynamics A	2 cp
-	et 2019mt	Electrical ship equipment	2 cp
-	mt806	Strength of materials 2	2 cp
-	mt825	Introduction F.E.M.	1 cp
-	wb2104	Systems and control engineering 1	2 cp
-	wi2256th	Linear algebra for TH-students	4 cp
-	wi1147th	Analysis for TH-students	6 cp
-	mt517	Geometry and Stability of ships	1.5 cp
-	mt215	Marine Engineering A	1.5 cp
-	mt518	Resistance and Propulsion 1	1.5 cp
-	mt519	Ship Motion and Manoeuvring 1	1 cp
-	mt731	Ship Production 2	1.5 cp
-	mt803	Ship Constructions 2	2.5 cp
-	mtp203	Project 2-3: Design 1	3.5 cp
		Total:	**32 cp**

The student gets exemption for the traineeship (10 cp) and for society oriented courses (4 cp).
In total this results in a programme of 32 + 84 – 14 = 102 cp.

1.4.4 Bachelor degree of Royal Netherlands Naval College (RNNC)

See website.

1.5 Variants, specializations and annotations MT

In order to enter the MSc-programme the student should compile a list of courses, which should be approved by the lecturer of the chosen specialization. This list should be filled in at a form, which can be acquired at the desk of the Education support staff and at the website.
In paragraph 1.2 the general requirements concerning the study programme are described.

Variants and specializations

There are 2 different variants and 7 specializations Marine Technology:

1 *Science*
  1.1 Ship Hydromechanics
  1.2 Ship and Offshore Construction

2 *Design, Production and Operation*
  2.1 Marine Engineering
  2.2 Ship Building
  2.3 Ship Design
  2.4 Shipping Management
  2.5 Offshore Systems Design

Annotations

There are also 3 annotations, which can be done as a supplement to the variant programme:

a Technical Marketing
b Offshore Technology
c Sustainable Development

1.5.1 Variant Science

General introduction

The development of new concepts of ships and other floating structures and the application of new construction materials require in-depth knowledge of and skills in the application of the fundamentals of hydrodynamics and structural strength. This is necessary since the design of novel structures generally cannot be based on past experience and existing concepts alone. Design based on the application of knowledge and skills with respect to first-principles are key words in this respect. The variant science is aimed at further development of such knowledge and skills under the assumption that the basics have been mastered in the bachelor phase of the programme.

Mathematics, advanced hydrodynamics, properties of new materials, advanced methods of structural analysis as well as advanced ship concepts make up the main part of the variant science.

Within the variant science there are 2 specializations:

- Ship Hydromechanics
- Ship and Offshore Construction.

If preferred, the MSc-thesis may cover both areas.

In the first year 14 credit points are devoted to compulsory subjects which include selected topics from both the hydrodynamic and structural disciplines as shown in the table below.

Obligatory courses variant Science

Course code	Course name	Lecture hours	Cp
wm0732mt	Maritime Law	4/0/0/0	2
mt514	Ship Motions and Manoeuvring 3	0/0/0/4	2
mt835	Integration Loads and Strength	0/0/4/0	2
mt523	Numerical Methods for MT	0/0/0/4	3
in	Advanced Programming	-/-/-/0	2
wb2310	System and Control Engineering 3	0/4/0/0	3
		Total	**14**

Another 22 – 34 credit points will be devoted to specific subjects selected in consultation with the head of the hydrodynamics or structural programme. A part of these credits may be used for a traineeship in industry. This traineeship may also be fulfilled in the final year, such after consultation with the head of the department.

The Msc-thesis may be carried out in co-operation with industry, research institutes or in-house depending on the students preference and availability of positions in industry.

Specialization Ship Hydromechanics

In the design and operation of ships and other floating structures, hydromechanics, i.e. hydrostatics and hydrodynamics, play an increasingly important role. This role is increasing due to the fact that more numerical methods for predicting the behaviour of the vessel and its propulsor are becoming available for use in evaluating a particular design or operation at an early stage of the development. As a final check on the performance of a ship model tests are often performed as in many cases computational methods, while giving an enormously increased insight in the effect of design parameters on the performance, do not always provide sufficiently accurate quantitative results for, for instance, contract purposes.

For the practicing hydrodynamicist, insight in the background of hydromechanic theory and the corresponding numerical methods used to generate practical data are indispensable. As a basis for understanding applied hydromechanics, knowledge and insight in the fundamental physics of ship/water and propulsor/water interaction as well as the underlying mathematical theories of hydromechanics are also necessary.

On completion of the master phase in Hydromechanics, the student can look forward to applying his or her knowledge and skills in the marine industry or in research institutes active in the marine field.

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Secretary	mr. P.W. de Heer	015 27 86873	p.w.deheer@wbmt.tudelft.nl

The following components make up the master programme:

First year

- Mathematics
- Applied aerodynamics
- Numerical methods in hydromechanics
- Mathematical methods in hydromechanics
- Advanced marine vehicles
- Manoeuvring and Seakeeping behaviour of ships and other structures
- Propulsion and Resistance of ships

Second year

- A traineeship in industry or at a research institute (6-10 weeks)
- MSc-thesis carried out either in co-operation with industry in the field of applied hydromechanics or a research project carried out at a research institute or in-house.

Examples of recent master thesis projects:

- An investigation into the hydrodynamics of slamming of the bow-flare of ships
- Dynamic motions analysis of a moored Kingsize Heavy Lift Vessel in waves
- Analysis and optimization of 'DICAS', a closer look at the Differentiated Compliance Anchoring System
- Wave-feed-forward in Dynamic Positioning using a real-time estimation of the wave field

- Application of the Extended Maximum Likelihood Method (EMLM) in Wave Drift Force estimation
- Design of a Cyclic Pitch Propeller for the Autonomous Underwater Vehicle S-COUT
- Observations of a three-dimensional sheet cavity on a hydrofoil
- Low-wash design of planing hulls
- Experimental study on water motions in a moonpool
- Surfing of sailing vessels in following seas
- Realistic inflow conditions for numerical simulation of green water loading

Obligatory courses specialization Ship Hydromechanics

Course code	Course name	Lecture hours	Cp
mt515	Resistance and Propulsion 3	2/2/0/0	2
mt524	Hydromechanics of Special Ship Types	0/0/4/0	2
		Total	**4**

Recommended elective courses specialization Ship Hydromechanics

Course code	Course name	Lecture hours	Cp
mt411	Offshore Technology	4/0/0/0	2
mt	Mechatronics in MT (not in 2002/2003)	0/0/4/0	3
wi4048	Mathematische methoden in de hydrodynamica		4
wi4011	Numerieke stromingsleer		4
wi4007tu	Fourier- en Laplace-transformaties		2-3
wi1089HWBC	Partiële differentiaalvergelijkingen		2
wi2090	Continuüm mechanica I		3.5
wi3025	Continuüm mechanica II		4
wi4014tu	Numerical analysis c2		4
ae2-115	Aërodynamica B		2
ae3-130	Aërodynamica D		2
ae4-151	Num. Meth. in de vliegtuig-aërodynamica		2
ct4130	Probabilistisch ontwerpen		3
	Choice from TBM courses on Psychology		
	Choice from TBM courses on Communication		
	Choice from TBM courses on Philosophy		
	Choice from TBM courses on History of Technics		
	Choice from TBM courses on Business, Finance, Management		
	Choice from TBM courses on Economy		
	Choice from TBM courses on Law and Legal aspects		
	Choice from TBM courses on Safety		
	Choice from TBM courses on Sustainability		
	Choice from TBM courses on Languages		

Specialization Ship and Offshore Construction

Ever since the advent of "open" ships, Ro-Ro ships and offshore constructions, design has become one of the most important fields of study for the marine engineer. Together with the classification societies, the engineers concerned at shipyards and design agencies bear responsibility for shape, choice of materials, production technology and dimensioning of the connecting parts. An important complication in this is that the fracture safety in welded constructions does not exclusively relate to the calculated stresses.
A designer should always be looking for the impossible. Relatively new sciences, such as finite element calculations and fracture mechanics, are just as well parts of the curriculum as are the knowledge of the quality degeneration of materials as a result of welding and cutting or the suppression of vibration and noise pollution.
Because of the situation described above, there is a definite demand for all-round strength experts. At the moment the opportunities for employment agree with the order of the following list:

- Firms of consulting engineers
- Oil industry
- Classification societies
- Shipyards
- Research institutes (e.g. TNO)
- Navy

Within the section there are various specialisms which are reflected in the scientific research being carried out in the Ship Construction Laboratory.
The section mainly concentrates on the effects of the topology, material and fabrication influences (imperfections, residual stresses etc.) of a construction on its behavior under varying loadings due to the seaway (fatigue) and at low temperatures (brittle fracture). Furthermore, attention is paid to impact-resistance and plastic collapse under compression.
The section also occupies itself with the controlling of vibrations and noise, generated by the propeller, the engines, the pumps, the ventilation systems, waves, etc. Attention is paid to a practical and fundamental discussion of vibration problems. As vibrations and noise activate one another, the problems of producing, transmitting and reducing noise from source to recipient are considered as well.
During the 4th year course work and the completing of one's studies, there is ample opportunity to get involved in the ongoing laboratory research. Another possibility is the participation in practical projects.

Examples of recent MSc-thesis subjects are:
- Numerical simulation of the impact strength of a Y-shaped shell structure during collision,
- Optimization of structural configurations for superstructures of mega-yachts,
- Research into the strength aspects of application of composites for sailing yachts,
- Simulation of structural response in the bow flare region of ships under impact pressures in heavy seas,
- Assessment of the possibilities of the Hot Spot SN method for fatigue life prediction of welded aluminium details,
- Optimization of lightweight aluminium panels for application in shipbuilding,

- Analysis of defects in the construction of suction hopper dredgers,
- Verification of a damage evolution model for G.R.P. woven fabric laminates,
- Evaluation of the reliability of the hull girder of a FPSO with respect to ductile collapse,
- Fatigue life prediction for a typical structural detail in aluminium,
- Ultimate strength assessment of a chord-section for a leg of the LeTourneau jackup,
- Evaluation of the fatigue strength of an "egg box" type intersection of plates in HTS,
- Impact strength of aluminium panels.

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Curriculum

This specialization knows two obligatory courses. After a consultation between student and supervisor, a curriculum is drawn up from the wide range of elective courses the university has to offer. The student's wishes and expectations with respect to his/her future job and, if possible, his/her final project, are taken into account.

Obligatory courses specialization Ship and Ofsshore Construction

Course code	Course name	Lecture hours	Cp
mt815	Ship Construction and Strength Special Subjects	0/0/3/0	1.5
mt830	Application of FEM	0/0/0/4	2
		Total	**3.5**

Recommended elective courses specialization Ship and Ofsshore Construction

Course code	Course name	Lecture hours	Cp
mt814	Ship Vibrations and Noise	0/0/4/0	2
mt816	Composite Materials for Ship Construction	0/0/0/2	1
mt212	Marine Engineering B	2/0/0/0	2
mt213	Marine Engineering C	0/2/0/0	1
mt411	Offshore Technology	4/0/0/0	2
mt515	Resistance and Propulsion 3	2/2/0/0	2
mt	Hydromechanics of Special Ship Types	0/0/4/0	2
mt	Mechatronics in MT (not in 2002/2003)	0/0/4/0	3
wb1309	Strength of Materials 3	0/0/0/4	2
wb1402A	Plates and Shells A	2/4/0/0	3
wb1405A	Stability of Thinwalled Structures I	0/0/4/2	3
wb1406	Experimental Mechanics	0/0/2/2	2
wb1409	Theory of Elasticity	2/2/0/0	2
wb1412	Non Linear Vibrations	0/0/2/2	2
wb1416	Num. Methods for Dynamics	0/0/2/2	2
wb1430A	Intr. to Fibre Reinf. Plastics	2/2/0/0	2
wb1430B	Fibre Reinf. Plastics: ext. course	0/0/4/4	4
wb1432	Mechanics of F.R.P.	2/2/0/0	3
wi3025	Continuum Mechanica II		4
ae3-525	FEM in constructies		2
ae4-528	Computerized structural analysis		2
ae4-533	Stab. v Dunwandige Constr. I		3
ae4-534	Stab. v Dunwandige Constr. II		2
ae4-535	Constr. Ontw. & Optimalisatie A		2
ae4-535	Constr. Ontw. & Optimalisatie B		2
mk5171	Lastechnologie		2
mk3411A	Bezwijkgedrag: Plasticiteit		2
mk2411B	Bezwijkgedrag: Breukleer		2
mk5641	Breukmech. Concepten bij Schadeanalyse		2
ct4130	Probabilistisch ontwerpen		3
ct5126	Vermoeiing		2
ct5122	Capita selecta: staal, alumin, vvk		3
ot4623	EEM voor Offshore Technologie		3
	Choice from TBM courses on Psychology		
	Choice from TBM courses on Communication		
	Choice from TBM courses on Philosophy		
	Choice from TBM courses on History of Technics		
	Choice from TBM courses on Business, Finance, Management		
	Choice from TBM courses on Economy		
	Choice from TBM courses on Law and Legal aspects		
	Choice from TBM courses on Safety		
	Choice from TBM courses on Sustainability		
	Choice from TBM courses on Languages		

1.5.2 Variant Design, Production and Operation

General introduction

This variant forms the basis of a number of specializations, which each give ample possibilities to combine in-depth technical studies with other more general aspects, such as logistics, management, finance, technical marketing and sustainability. As such, the variant is tailored at students of the applied maritime sciences. It will be of interest to students aiming at being an allround maritime graduate rather than a specialist.

The variant covers 15 credit points of obligatory subjects spanning a wide range of subjects of interest for students of this variant. These are shown in the table below.

Obligatory courses variant Design, Production and Operation

Course code	Course name	Lecture hours	Cp
wm0732mt	Maritime Law	4/0/0/0	2 1)
	Mechatronics in MT	0/0/4/0	3
mt411	Offshore Technology	4/0/0/0	2 1)
	Design Meth. & Knowledge Eng.	4/0/0/0	3 1)
	Maritime Business Game	0/0/0/4	2
mt726	Project Management	0/4/0/0	3
		Total	**15**

1) these courses will not yet be offered in the course year 2002-2003. Depending on the starting date of their MSc-thesis, students of this variant may substitute the corresponding credit points with subjects of their choice, within the general constraints imposed by the MSc-programme of MT.

specialization Marine Engineering

Marine Engineering is the discipline that covers the design, installation and operational use of ship machinery and electrical plants. It covers a wide variety of systems, such as: ship propulsion plants, electric power generation, refrigeration and climate control, auxiliary systems for cooling and lubrication, cargo handling, loading and unloading.
The main issue is "installation technology": integration of different equipment to well functioning, efficient and cost effective systems. It requires extensive knowledge of machinery and electrical equipment (principle of operation and characteristics such as controllability and maintainability) as well as of fluid dynamics, mechanical vibrations and strength, thermodynamics, reliability and maintainability. The design of the equipment to be installed is not a main topic of study.
The students specialising in marine engineering have a wide choice with regard to elective courses. Approximately 24 credit points can be used for elective courses. The MSc-thesis covers 42 credit points and will frequently be performed in cooperation with industry or an external research institute. The specialization has good contacts with universities abroad, which gives the opportunity to perform a part of the study (courses or the MSc-thesis) abroad.

The MSc- thesis will be performed on one of the research topics on which the section is active:

- Investigation in the dynamic behaviour of machinery systems. To realise this, much effort is paid to the development of simulation models of equipment and systems and the dynamic simulation of complete systems
- Maintenance engineering. Work is done on the development of cost effective and safe maintenance plans as well as on intelligent condition monitoring. Use is made of artificial intelligence and also system simulations
- Development of new design tools and innovative system designs
- The MSc- thesis may have a practical as well as a more fundamental theoretical nature

Examples of recent MSc- thesis subjects are:

- Development of a simulation model of a dredging pump
- Technical and economical investigation into an all-electric ship (AES) concept for a chemical tanker
- Model development and simulation of the dynamic behaviour of a complete propulsion system (engine, propeller and ship) in a heavy seaway
- Sensor monitoring with the help of neural networks
- Development of an economical decision model for spare parts to be carried on board.

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Obligatory courses specialization Marine Engineering

Course code	Course name	Lecture hours	Cp
mt212	Marine engineering B	0/2/0/0	2
mt213	Marine engineering C	0/0/0/2	1
		Total	**3**

Recommended elective courses specialization Marine Engineering

Course code	Course name	Lecture hours	Cp
ae4-496	Maintenance technology	0/0/2/2	2
in4013tu	Expert systems in a technical environment	0/2/2/0	3
tn3713	Advanced thermodynamics	0/0/2/2	2
wb1308	Dynamics 3	0/0/4/0	2
wb1321	Heat and masstransfer	0/0/4/0	2
wb1413	Multi – body dynamics	0/0/2/2	2
wb2310	System and control technology 3	0/4/0/0	3
wb2311	Introduction to modelling	4/0/0/0	2
wb2400	Process control	0/0/2/2	2
wb2402	Hydraulic servo systems	2/2/0/0	2
wb3407A	Logistics: introduction	0/0/2/2	2
wb4408A	Diesel engines A	0/0/2/2	3
wb4408B	Diesel engines B	2/2/0/0	3
wb4410A	Refrigeration fundamentals	2/2/0/0	2
wb4420	Gas turbines	2/2/0/0	2
wb4421	Gas turbines simulation and application	0/0/2/2	2
wb4424	Indoor climate control design	0/0/2/2	3
wb4426	Indoor climate control fundamentals	0/0/2/2	2
wb4427	Refrigeration technology and applications	0/0/2/2	2
wb5415	Maintenance management	2/2/0/0	1,5
wi3021tu	Applied statistics B	0/0/2/2	3
wi4019	Non-linear differential equations	0/4/0/0	4
wi4052	Risk analysis	0/0/2/2	2
wm0301tu	Introduction to philosophy for technologists	0/2/0/0	2
wm0324lr	Ethics and technology LR		2
wm0801tu	Introduction to safety: methods and techniques	0/4/0/0	2
wm0903tu	Technology and global development	0/0/2/2	3
wm0909tu	Techn. Assessm.: towards an envir. friendly techn.	0/0/2/2	2
wm1102tu	Written English for technologists		2

Specialization Ship Building

Shipbuilding covers all subjects related to the newbuilding, modification, repair, maintenance and scrapping of ships, offshore platforms and other floating maritime objects. It covers the entire process, starting from its product definition as given by the design, through the production itself and the delivery to the client, to the ensuing warranty and ultimate scrapping.

Important areas of interest are:

- The technical processes involved in the various production steps, from engineering through prefabrication to assembly and conservation
- The production tools used for all the process steps, including CAM, ICT and robotics

- The mutual dependence between the design of the product (ship) and the processes (yard) to fabricate it and the consequent optimisation of the latter
- The production factors and constraints involved in shipbuilding, such as labour, technology, environmental considerations, access to capital etc
- The building strategies ranging from 'doing all in-house' through sub-contracting and co-makership to large-scale outsourcing; and from largely labour-dominated to fully automated work methods
- The flow of materials, information and people in the process and all the interactions that take place
- The logistics and management involved in such complex processes, including project management, organisational behaviour, general management, negotiating and resolving conflicts
- The financial and legal issues involved in building ships, from labour relations to contracts and financing arrangements to financial analysis of shipyard performance
- The dynamics of the world-wide shipbuilding and repair market including price developments, newbuilding volumes, globalisations, subsidies, niche-markets, second-hand pricing, etc;
- Decision-making processes to harmonise all of the above and develop strategically sound approaches to various problems

Shipbuilding involves building mobile objects in a transparent, global market and thus is faced with world-wide competition in which the various production factors and the efficiencies decide the success of an individual company. Ships are complex objects, invariably made as a one-of or in very small series. The fact that ships operate in harsh environments and must be able to be autonomous for many weeks and sometimes months, leads to a multitude of different systems which all must be fitted harmoniously to each other and to the (steel or aluminium or composite) structure of the ship. Graduates in shipbuilding are expected to be able to oversee this complex process at the various levels of aggregation and synthesise the various aspects into a sound decision-making model.

Research

The research of the section "Shipbuilding" is focussed on:
- Identifying the parameters which have impact on the various parts of the 'shipbuilding' system and investigating the cause and effect relations between the relevant parameters
- Researching the qualitative and ultimately quantitative models describing the relations
- Researching the optimal management and control strategies to streamline and rationalise the processes
- Developing the methodology and technology for the proper application of the research results in practical situations

The precise choice of topics is of course driven both by the expected mid-term and long-term developments in basic technology and the way the industry is expected to unfold. The research is co-ordinated within a single DUT-research programme, entitled "Intelligent Shipbuilding & Shipping Processes", for which the description is available on the internet. In this programme the section co-operates intensively with the sections of Ship Design and, for the part of shipping, the University of Antwerp – ITMMA.

Besides this theoretical research the section participates in industrially relevant, applied research. While the Dutch shipbuilding sector is the prime partner in the research and education, the horizon of the section stretches across Europe into the global market of shipbuilding. Typical examples of recent research projects are:

- Developing robots for the building of mid-size and small ships in small series
- Planning and job-preparation on ship repair yards
- 3D photographic measuring techniques for ship repair
- Exploitation models for inland shipping
- Establishing a development strategy for the Dutch shipbuilding industry

Within the scope of a long-term research effort in cooperation with the Dutch industry the following projects will be undertaken together with other major players:

- Concurrent engineering
- Virtual prototyping
- Product-data modelling and design tools (in co-operation with the section of Ship Design)
- Optimisation of the match between product and process
- Standardization and modularization
- Robotisation of various tasks, not limited to welding
- Supply chain optimisation between yard and suppliers

Shipbuilding and its research require the synthesis of many facets. Since the section does not aim at specialised, but vital technologies such as ICT and robotics, cooperation with specialised groups within and outside the DUT is explicitly pursued.

Other maritime fields covered by the Specialization Ship Building

Next to the core activities as highlighted above, the section provides specialist knowledge and courses on:

- Inland shipping
- Salvage, which are taught at the MSc-level and also may serve as the basis for specific graduation research work

MSc-thesis

Thesis subjects preferably, but not necessarily, fit the focal area of the section's research programme. The relations with industry do not only benefit the mentioned research but also serve as interesting placements for graduation work.

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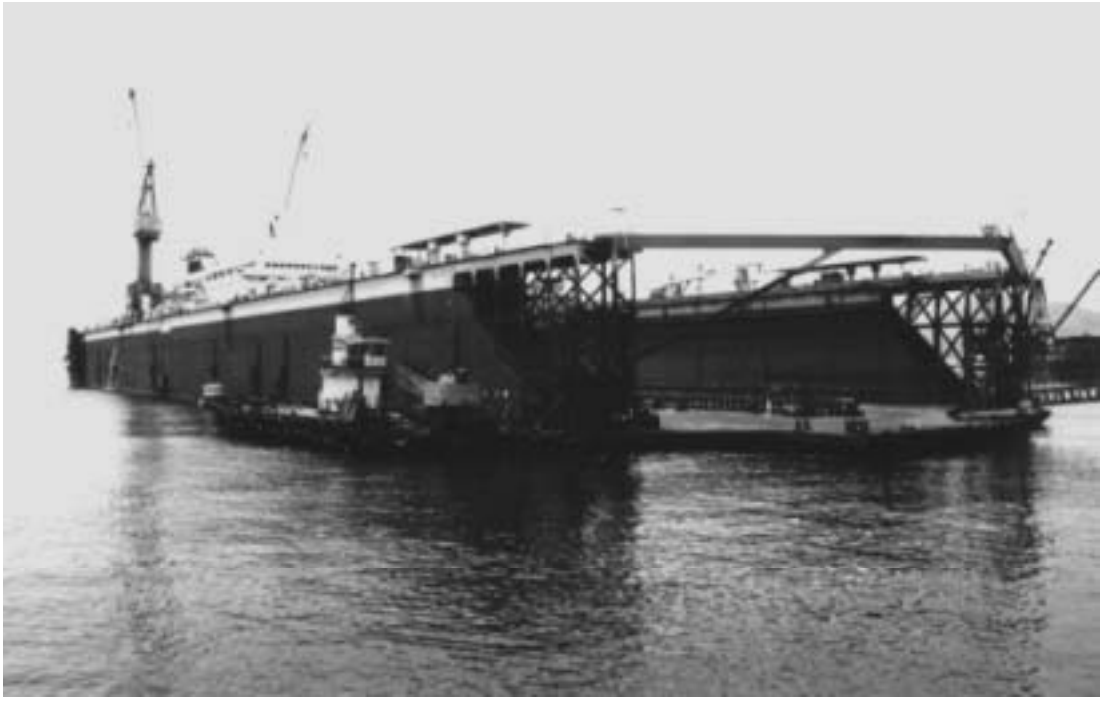
Obligatory courses specialization Ship Building

Course code	Course name	Lecture hours	Cp
mt728	Ship repair and salvage	0/0/2/0	2
wm0504 / 0505	Industrial organisation A or B		2
		Total	**4**

Recommended elective courses specialization Ship Building

Course code	Course name	Lecture hours	Cp
	Labour and organisational psychology		
mt724	Ship finance	0/0/2/0	1
	Transport, routing and scheduling		
	Logistics		
	Planning techniques		
mt725	Inland shipping	0/2/0/0	1
mt727	Shipyard process simulation and strategy		
	Financial management		
	Operations research		
	Robotics		
	Materials		
	Composites		
	Fabrication techniques and welding		
	Information and communication systems		
	Data-base management		



Specialization Ship Design

The design of vessels can be characterised as reaching a synthesis of knowledge in order to design a vessel which can be operated in an optimal, economical way in a harsh Marine environment. The MSc- thesis is generally done in co-operation with maritime oriented companies like yards, ship owners etc. This unique approach creates the opportunity to study and develop actual subjects. On top of this it guarantees a thesis based on recent technical and economical information.

Possible subjects for a MSc- thesis are:

- Design of a ship, a maritime construction or a part of it
- Development of a design method for a new ship-type or a part of it
- Development and creation of design tools
- Calculation of the economical performance of the designs using optimisation methods

Some titles of executed MSc- thesis studies are:

- The development of a new multifunctional salvage vessel for big salvage operations at sea
- A design study of a 2.2 million barrel oil tanker with double skin
- The influence of the tank arrangement on the design of chemical tankers
- The design of seagoing container vessels with a dedicated transfer system towards inland barges

- Concept exploration model for semi-submergible platforms
- Design study for a single-point moored tanker for the oil production

Some typical research areas of the department self are safety and environment, CAD/CAM design and calculation models and the design of advanced marine vehicles.

Jobs will be found in the following types of companies:
- Shipyards
- Independent engineering offices
- Ship owners
- Royal Navy
- University

Because the design of vessels is actually the most multidisciplinary direction of all within Marine Technology, it enables people to find a broad area of possible employers.

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Secretary	mrs. D.Heersma	015 27 86868	d.heersma@wbmt.tudelft.nl

Obligatory courses specialization Ship Design

Course code	Course name	Lecture hours	Cp
mt112	Ship Design 3	4/0/0/0	2
mt113	Ship Design 4	0/4/0/0	2
mt411	Offshore Technology	4/0/0/0	2
mt514	Ship Motions and Manoeuvring 3	0/0/0/4	2
mt515	Resistance and propulsion 3	2/2/0/0	2
		Total	**10**

Recommended elective courses specialization Ship Design

Course code	Course name	Lecture hours	Cp
mt213	Marine engineering C	0/2/0/0	1
mt816	Composite materials in shipbuilding	0/0/0/x	1
wb3407A	Logistics: introduction	0/0/2/2	2
wb3410	Large-scale transportation systems	0/0/2/0	1
wb3413	Dredging processes 1	2/2/0/0	2,5
wb3414	Dredging processes 2	0/0/2/2	2,5
wm0102tu	Psychology of work	0/0/2/2	2
wm0504tu	Industrial organisation	4/0/0/0	2
wm0610tu	Micro-economics	2/0/0/0	1
wm0611tu	Cost information	0/2/0/0	1

Specialization Shipping Management

The specialization is a joint activity of TU Delft and the Institute of Transport & Maritime Management (ITMMA) of Antwerp University. Prof. Dr. E. van de Voorde of ITMMA heads the specialization, while the coordination is in the hands of ir J.W. Frouws (TU Delft).

The Chair in Shipping Management is part of the section Design of Ships.
The Chair started in 1973, under responsibility of prof. ir. Dijkshoorn. When he retired, in 1988, 43 students had graduated. Since 1988 95 engineers have graduated, and hundreds of students from several faculties have attended the lectures. Also, some students from the department of Logistics Engineering and from Mechanical Engineering have graduated at this chair.

Marine Technology is a department that teaches their students how to design a ship for a mission, e.g. cargo transport or services. One piece in the process that translates the mission into a new ship, is determining the demands made on the ship. These demands come from international and national organisations, like IMO, Lloyd Register or "Scheepvaartinspectie". Just as important, however, are the demands made by the market and the customers.

The last category is par excellence the field of the Chair in Shipping Management. This specialization concentrates on the use of the ship, and the demands this makes on the ship. This generates questions like:

- What will I use my ship for?
- What ship type should I use?
- Do I order a dedicated ship type, e.g. an oil tanker, or a combination carrier, e.g. an OBO carrier?
- What size must my ship be?
- Will I buy a new ship or a second-hand one?
- Where will I build my ship: In the Far East or in Europe?
- May a new concept ship design be necessary?

This is only a small number of the questions that concerns a ship owner. To give a good answer to these questions, the ship owner must observe his environment very carefully. He will consider whether there is a need for his service and whether there is enough demand for cargo capacity to make his ship profitable. To achieve this, he makes market analyses, studies of cargo flows and observes his competition.

The ship owner may concentrate on a large market, like the oil market or the bulk market, but he may also concentrate on a niche market, like heavy lift transport. In the first case he is one of the many players and he has little influence on the market, in the second case he is an important player with a high level of specialization. Both market types have advantages and disadvantages, and both have their specific effects on the ship design. Niche markets often require specialised, advanced ship types.

Ship owners consider the design of ships from the viewpoint of shipping. Without knowledge of shipping, the exploitation of ships, the shipping world, cargo markets, financing, freight markets, etc., one cannot design a good ship. Innovations in ship design are often initiated by the maritime world and are not necessarily technology-driven. The shipping engineer shapes new opportunities, supported by the knowledge from this complex environment.

A ship owner should try to distinguish himself from his competitors and this way establish a better competitive position. An example is the HSS of Stena Line, which, with a speed of 40 knots, makes the passage between Holyhead and Dun Laoghaire much faster. This is not only beneficial for the passenger, but it also means that the ship owner can better utilise his ship. Instead of one crossing per day, he may be able to make two crossings per day with only one ship. This is a way to increase revenues and profits, in spite of the higher building and operating costs of the ship. The concept is so successful that Stena has decided to perform also the service between Harwich and Hook of Holland with this type of vessel.

Most graduates from the chair work in the shipping industry, e.g. for ship owners, transport companies, ship financers, maritime researchers, government, etc. They are united in the NVVR (Nederlandse Vereniging van Rederijkundigen) and keep in touch regularly.

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Secretary	mrs D.Heersma	015 27 86868	d.heersma@wbmt.tudelft.nl

Obligatory courses specialization Shipping Management

Course code	Course name	Lecture hours	Cp
mt313	Shipping management	0/0/0/4	2
wb3407A	Logistics: introduction	0/0/2/2	2
		Total	**4**

Recommended elective courses specialization Shipping Management

Course code	Course name	Lecture hours	Cp
mt112	Ship Design 3	4/0/0/0	2
mt113	Ship Design 4	0/4/0/0	2
wb3407C	Modelling and simulation logistic systems	4/0/0/0	2
wb3417	Discrete syst.: modeling, prototyping, simul. & control	2/2/0/0	2
wi4070tu	Digital simulation A	4/0/0/0	3
wm0605tu	Business economics for engineers	2/0/0/0	3
wm0611tu	Cost information	0/2/0/0	1
ct4330	Ports and shipping lanes 1		4,5
ct5306	Ports and shipping lanes 2		4,5

Specialization Offshore Systems Design

This specialization is part of the section Ship Design and is active with the design of floating structures, which can be used for industrial activities at sea. Examples of existing floating or sinkable constructions are: semi submersibles, tension leg platforms, self-rising islands, one point moored tankers etc. the industrial activities executed on board of these structures are often a result of oil and gas exploration of the seas. Other activities are dredging, mining, energy production and civil building or salvage operations. This discipline focuses on the design of constructions and integration of certain specific hydrodynamic and structural aspects in these kind of constructions.

Very often one of the more specific disciplines is the leading factor in the design of the structure. In that case a combination is made between the specific chair for example construction or hydrodynamics and design. In that case the student finalises his study under the responsibility of two chairs.

General fields of study are:
- Design of units or a part of it
- Feasibility studies of new concepts
- Development of design tools
- Optimisation (technically and/or economically) of units

Typical examples of subjects for MSc- thesis are:
- Development of a computer programme for the analysis of jack-up platforms
- Design aspects of dynamic positioned "weather-vaning" production platforms
- Design of unmanned booster stations
- Design tools for the conceptual design of semi submersibles
- Design of a construction for the installation of sub-sea equipment

Jobs are normally found in engineering offices, oil-companies, ship yards, classification societies, research institutes and construction companies etc.

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Obligatory courses specialization Offshore Systems Design

Course code	Course name	Lecture hours	Cp
mt112	Ship Design 3	4/0/0/0	2
mt113	Ship Design 4	0/4/0/0	2
mt411	Offshore Technology	4/0/0/0	2
mt514	Ship motions and manoeuvring 3	0/0/0/4	2
ot4652	Floating offshore constructions	0/4/0/0	2
ot4652	Offshore moorings	0/0/4/0	2
		Total	**12**

Recommended elective courses specialization Offshore Systems Design

Course code	Course name	Lecture hours	Cp
mt213	Marine engineering C	0/2/0/0	1
mt816	Composite materials in shipbuilding	0/0/0/2	1
mt830	Application of finite element methods	0/0/0/4	2
wb3407A	Logistics: introduction	0/0/2/2	2
wb3410	Large-scale transportation systems	0/0/2/0	1
wb3413	Dredging processes 1	2/2/0/0	2,5
wb3414	Dredging processes 2	0/0/2/2	2,5
wm0102tu	Psychology of work	0/0/2/2	2
wm0504tu	Industrial organisation A	4/0/0/0	2
wm0610tu	Micro-economics	2/0/0/0	1
wm0611tu	Cost information	0/2/0/0	1

1.5.3 Annotations

As an addition to the variant programme there are three annotations, to broaden the knowledge on a certain subject. After completing such an annotation, the student gets a supplement to the MSc-degree, which declares a more than average knowledge about that subject. These annotations are:

a Technical Marketing
b Offshore Technology
c Sustainable Development

The study programme, including an annotation, has to comply with the requirements of paragraph 1.2 (84 cp).

Annotation Technical Marketing

The Technical Marketing annotation offers students the possibility to get knowledge and skills in a more commercial direction. The study programme is meant for students, who want to prepare themselves for a technical commercial function (sales, marketing), in the area of their variant and specialization.
The study programme will be determined in consultation between student, lecturer responsible for the chosen variant and specialization and the responsible lecturer for Technical Marketing (prof. mr. dr. Sicco S. Santema). The marketing component in the study programme consists of at least 10 cp marketing courses and 16 cp of the MSc-thesis should be devoted to marketing aspects. This means that a major part of the elective courses has to be used for technical marketing. The marketing content of the MSc- thesis should be complementary to the chosen variant and specialization. Normally this part involves a marketing research study, for products, which still have to be developed, or a market introduction study, for developed products, but not yet introduced into the market. At the end of the MSc- thesis integration between marketing and technology will take place. This will result in a synthesis report.
Both the lecturer of the chosen variant and specialization and a technical marketing lecturer will guide the student.
The responsible lecturer for Technical Marketing is prof. mr. Dr. Sicco C.Santema (phone 015 27 83076; e-mail S.C.Santema@io.tudelft.nl). The Technical Marketing guidance of students will be co-ordinated by dr. H.M.J.J. Snelders (phone 015 27 83108; e-mail H.J.M.M.Snelders@io.tudelft.nl).

Obligatory courses annotation Technical Marketing

Course code	Course name	Lecture hours	cp
ID4141	Consumer research	0/0/3/3	4
ID5131	Business marketing for engineers	0/0/2/0	2
IDE511	Integral aspect of business marketing	0/0/0/4	2
	Total		**8**

Recommended elective courses annotation Technical Marketing (at least 2 cp)

Course code	Course name	Lecture hours	cp
wm0720	Bedrijfsrecht A / ondernemingsrecht	0/0/4/0	2
wm0115	Conflicthantering en onderhandelen	0/3/0/0	1
	Other courses relevant for TM		

Annotation Offshore Technology

The Offshore Technology annotation offers students the possibility to get knowledge and skills with regard to the complete field of offshore engineering. It is an interfaculty study programme, which is offered via the Delft Interfaculty Centre for Offshore Technology (DICOT). The annotation can be obtained in combination with both variants. The Participant's guide to the interfaculty Offshore Technology MSc curriculum can be obtained from DICOT (W.W. Massie MSc, P.E.; phone 015 27 84614; e-mail w.w.massie@offshore.tudelft.nl)
The study programme will be determined in consultation between student, lecturer responsible for the chosen variant and specialisation and the responsible lecturer for Offshore Engineering (prof. dr.ir.J. Meek or W.W. Massie). The offshore component in the study programme consists of at least 20 cp offshore courses and the MSc-thesis should be devoted to an offshore technology subject. This means that the elective courses have to be used for offshore engineering; some of the obligatory courses for the chosen variant and specialisation may be left out in consultation with the lecturers. The offshore content of the MSc-thesis should be complementary to the chosen variant and specialisation.
Both the lecturer of the chosen variant and specialisation and an offshore lecturer will guide the student.

Obligatory courses annotation Offshore Technology

Course code	Course name	cp
ot4600	Survey of offshore technology	5
ot4615	Oceanography and waves (only the oceanography part)	1
ct4130	Probabilistic design	3
ot4620	Offshore hydromechanics (for students MT only partly)	2
	total	**11**

Elective Courses annotation Offshore Technology (at least 9 cp)

Course code	Course name	cp
ot4620	Offshore soil mechanics	2
ot4651	Bottom founded structure design	4
ot4652	Design of floating structures	3
ot4653	Subsea engineering and marine pipelines	3
ot4661	Offshore moorings	3
ot5662	Subsea engineering design	3
ot5663	Offshore windfarm design	3

Annotation Sustainable Development

Sustainable development is becoming of increasing importance. Questions are: " What does the world look like in 50 years?" or: " What should the world look like in 50 years?" . The curriculum is based on elective courses, a colloquium and the MSc-Thesis. The aim of the colloquium is to develop broad knowledge of all kinds of environmental an technical issues and to place this in perspective.

The curriculum should include:

- colloquium in sustainable development of 2 cp
- 4 courses, each not less than 2 cp; to be chosen from the following clusters:
  - Design, Analysis and Tools (General)
  - Design, Analysis and Tools (Marine Technology)
  - Organisation
  - Policy and society
- MSc-thesis, which shall be devoted also to sustainable development. The coordinator shall approve the problem formulation of the thesis and the extent to which sustainable development is integrated into the thesis. The coordinator shall further determine whether the theme of sustainable development has been sufficiently integrated into the problem formulation, the execution of the project and the project report.

Further information on the available courses can be obtained at the website http://www.odo.tudelft.nl and from ir. J.W. Frouws (phone: 015 27 86606, email: j.w.frouws@wbmt.tudelft.nl), who is the coordinating lecturer for Marine Technology, with regard to sustainable development.

1.5.4 Technical University Teacher course (TULO)

Graduated Masters of Science Mechanical Engineering or Maritime Technology have the opportunity to participate in a special course to become a high school teacher in science or mathematics.
There is a standard course, which includes 42 cp. A maximum of 21 of these points can be integrated in the MSc study programme, the other, at least, 21 points have to be earned in a post MSc course.
For more information on admission to the programme and the study programme please contact the office of TULO.

Office of TULO
faculty TBM
Jaffalaan 5, 2628 BX Delft.
Phone: 015 27 82786 / 015 27 83768
E-mail: j.geerlings@tbm.tudelft.nl

1.6 Enrolling for courses and tests

There are different procedures to enroll. Usually it is necessary to enroll for courses and tests.

- courses: students can enroll for specific courses at Blackboard. Most of the communication between lecturer and students goes by blackboard announcements. Also exchange of information, assignments and reports often takes place via Blackboard.
- tests: enrolling for tests is compulsory and can be done at the TAS-site ('Tentamen Aanmeld Systeem' http://www.tas.tudelft.nl). This should be done two weeks before the test takes place, at the latest, otherwise the test will not be accounted for by the lecturer. If a student has enrolled, but decided not to do the test, the student must cancel this, at least one week before the test takes place.
- when first using TAS the student must choose a personal password. This can be done by using the campus card in a card reader. At the faculty there are two card readers: one is located near the Pallas / Parthemus computerroom (4, 1st) and one is located at Education support staff (8B, 3th).

1.7 Pass rules and criteria for 'honours-degree'

Pass rules

To pass a course or assignment, a grade of at least 6 is necessary. It is possible to pass the MSc-examination with one grade of 5. The grades are rounded off to the nearest integer.

Examination

On completing the programme, the student should apply for the Master's examination by means of a form, available from the Education Support Staff.

'honours- degree'

The 'honours-degree' is granted to graduates with the following study results:

- grade average is at least 7,5
- no grades lower than 6
- grade for MSc- thesis is at least 8
- not more than 2,5 years to complete the MSc-programme

This is a summary from part of the "Regulations and guidelines for the board of examiners", appendix 6.4 of this studyguide.

1.8 Career perspective of the Maritime Engineer

The majority of graduates from Marine Technology - Naval Architects and Marine Engineers - find their way within the maritime sector: shipyards, shipowners, offshore industry, maritime research institutes, classification societies, navy, dredging industry, etc. The broad BSc-programme and the choice of MSc specialization programmes make Delft graduates in Marine Technology find different jobs as a designer, manager, automation expert, etc.
The labour-market perspectives for Naval Architects and Marine Engineers with scientific education from Delft are good: about 85% of the graduates have a paid job within 3 months, the majority with a permanent appointment. On average they spend about 1 month to get their first job. The average monthly starting salary in 2000 was € 2330.

2 Bachelor/Master system: a brief explanation

In the year 2000 29 European ministers of education have signed the "Bologna Declaration on the European Space for Higher Education": the first step towards implementation of the Bachelor/Master system in the Netherlands. The main targets of this system are:

- to stimulate international mobility of students
- development of international study paths
- an increase of the transparency and harmonization of the educational system
- better international recognition of the Dutch educational programmes

The system has been implemented in the Netherlands per september 2002. TUD is the first university in the Netherlands, which implements the system within all its study programmes. The result is 15 BSc- and 23 Msc-programmes.

The traditional programme of 5 study years is divided in a BSc-programme of 3 years and a MSc-programme of 2 years. The BSc-programme ends with a BSc-thesis. Only after completing the MSc-programme the education is complete.

Features of BSc:

- selecting and orientating propedeutic exam
- collective courses in clusters
- BSc-thesis as an integral test of the study programme
- official language is Dutch

Features of MSc:

- several variants and specializations based on research
- better admittance of foreign students
- official language is English, but in the course year 2002/2003 still much courses will be taught in Dutch
- degree with the title 'Ingenieur' or 'Master of Science'

The TU Delft emphasizes that the implementation of this system should in no way interfere with the progress of students, which started their study before 2002. If, however, this occurs it is recommended to consult one of the student advisers.

3 Organisation

3.1 Faculty

The faculty Mechanical Engineering and Marine Technology offers the study programmes Mechanical Engineering (ME) and Marine Technology (MT).
The organisation of the faculty and the structure of the educational and board of examiners of the faculty are described in the faculty regulations.
The dean has the final responsibility for the faculty. He is assisted by the education director. Together with the department heads they form the management team. The dean is supported by the Faculty Staff and is advised by a number of advisory boards.

Dean prof. ir. W. L. Dalmijn
phone: 015 27 85401
e-mail: w.l.dalmijn@wbmt.tudelft.nl

3.2 Education support staff

The education support staff is executing the education support of the study Marine Technology. For all issues related to the Marine Technology study the students can get information. The Education Support Staff consists of the following persons:

Joke Ammerlaan	Secretary	j.m.a.ammerlaan@ocp.tudelft.nl	Tel. 015 27 86959
ir. Nic-Jan van Bemmel	Education Manager	n.j.vanbemmel@wbmt.tudelft.nl	Tel. 015 27 88791
Fatma Çelik	Study Administration	f.s.celik-cinar@wbmt.tudelft.nl	Tel. 015 27 86753
Teuni Eden	Study Adviser	t.eden@wbmt.tudelft.nl	Tel.015 278 2176
Lies Gesink	Study Administration	e.g.gesink@wbmt.tudelft.nl	Tel. 015 27 86591
Aad Gutteling	Study Administration	a.gutteling@wbmt.tudelft.nl	Tel. 015 27 86753
Louise Karreman	Study Administration	l.m.karreman@wbmt.tudelft.nl	Tel. 015 27 83457
prof.ir. Hans Klein Woud	Education Director	j.kleinwoud@wbmt.tudelft.nl	Tel. 015 27 81556
Ewoud van Luik	Manager Study Administration and webmaster	e.p.vanluik@wbmt.tudelft.nl	Tel. 015 27 85734
dr. ir. Dick Nijveldt	Education Adviser	d.nijveldt@wbmt.tudelft.nl	Tel. 015 27 85921
Carel Piguillet	Software Support	c.f.f.piguillet@wbmt.tudelft.nl	Tel. 015 27 86820
ir. Jaap v.d. Zanden	Study Adviser	j.vanderzanden@wbmt.tudelft.nl	Tel. 015 27 82996

Education Support Staff
Mekelweg 2,
Location 8B, 3th floor
2628 CD Delft
Phone: 015 27 86959 or 015 27 83457
Fax: 015 27 88340

3.3 Education committee

The education committee advises the dean and the education director on the contents and the structure of de study programme and the examinations.
The education committee exists of four lecturers and four students. Also the education director, the education adviser and a study adviser take part in the meetings.

Chairman
prof. dr. ir. J.A. Pinkster
room 7 – 1 - 127
Mekelweg 2
2628 CD Delft
phone: 015 27 83598
e-mail: j.a.pinkster@wbmt.tudelft.nl

Secretary
mw. J.M.A. Ammerlaan
room 8B – 3 - 08
Mekelweg 2
2628 CD Delft
phone: 015 27 86959
e-mail: j.m.a.ammerlaan@ocp.tudelft.nl

3.4 Board of examiners

The board of examiners consists of all lecturers, involved in the study programme, as mentioned in paragraph 1.3.
The board of examiners is responsible for the rules and regulations of the examinations and the assessment of the examination results. Requests can be addressed to the board of examiners for participating in a deviating study programme.

Chairman
prof. ir. J. Klein Woud
room 7-1-121
Mekelweg 2
2628 CD Delft
phone: 015 27 81556
e-mail: j.kleinwoud@wbmt.tudelft.nl

Secretary
E.P. van Luik
room 8B-3-06
Mekelweg 2
2628 CD Delft
phone: 015 27 85734
e-mail: e.p.vanluik@wbmt.tudelft.nl

3.5 Students association

'Scheepsbouwkundig Gezelschap William Froude' is the students association for all students Marine Technology, an association for and by students. Froude looks after the students and organizes a variety of social and technical activities.

Activities

Froude organizes excursions to enterprises in Holland and abroad, case tours, workshops and overnight-tours. Further Froude organizes symposia and lectures.

To support contact with fellow students sports days, drinks and parties are being organized.
Froude coordinates the contact between students and the faculty. Students have a say in the organization of the education and changes in the study programme. Froude has organized a variety of excursions abroad over the years. Every year the MBE ("mulitple day excursion") is organized. The MBE is a five-day journey orientated on Marine Technology to, for example, Scotland, Venice or Denmark. Once every two years a two or three weeks journey is organized to, for example, the USA, Russia, Japan or China. By working on a maritime project in an enterprise, students can earn a part of the travelling expenses.

Pass by

Froude has an office in the corridor behind the design studios (8B, 1st). In our room the coffee is ready and the soda is cold. Everybody is welcome to ask questions about lectures, to complain about assignments or just to tell his/her story. It is very important for us to know what is going on in the study, so, when necessary, we can act on it.

S.G. "William Froude"
Mekelweg 2
2628 CD Delft
Phone: 015 27 86562
Fax: 015 27 85602
E-mail: froude@wbmt.tudelft.nl
http://www.froude.tudelft.nl

3.6 Student guidance

For assistance and advise to students the faculty has two study advisers. The study adviser is the person for questions or problems related to the study or about issues, which may influence the ability to study. The study adviser functions as oracle (vraagbaak) and as confidential consultant to students.
The study adviser has no educational responsibilities and can, therefore, devote himself totally to individual students and to help solving their problems which may be an obstacle to their study progress. He also takes seat in a lot of boards and has contact with the lecturers, so that he has up to date information about what is going on in the study Marine Technology. He also has contact with other study advisers and personal advisers at the TU Delft and outside the University; so he knows what is going on elsewhere.

During a talk with a study adviser, often intimate information comes up. The student can be sure that this information will be dealt with confidentially. This kind of information will only be used after consultation with the student, to plead to apply TU- or faculty regulations. A study adviser can decide, as result of certain conditions, to advise e.g. the board of examiners, in favour of a specific student. When necessary the study adviser becomes an intermediary between TU Delft personal advisers: student, deans, psychologists and physicians.

The amount, in which the study adviser pays attention to a student, is up to the student. The study adviser keeps an eye on the study progress of most of the students and calls up one when necessary, but it is strongly recommended to contact the study adviser yourself when a question or problem comes up. Waiting often results in an increase of the problem.

The two study advisers at the faculty are available for all questions. They also have their own specialisms.

mrs. Teuni Eden
Specialisms: International contacts, guidance of foreigners and female students
Mekelweg 2, 8B 3th floor, room 20
Email: t.eden@wbmt.tudelft.nl
Phone: 015 27 82176
Consulting hours on weekdays from 12.30 till 13.30 hrs.

ir. Jaap v.d. Zanden
Specialisms: MSc students, polytechnic high school students, quality control, student mentors
Mekelweg 2, 8B 3th floor, room 19
Email: j.vanderzanden@wbmt.tudelft.nl
Phone: 015 27 82996

Dyslexia

Students having dyslexia usually have problems with reading and understanding of long texts. This can be an obstacle to 'normal' study progress. Therefore these students are advised to contact one of the study advisers and to set up a remedial plan. Important issues are:

- A planned study delay often helps
- When necessary, longer time for tests is possible
- Studying with a fellow student often results in more study progress
- IBG has extra student grants

3.7 Quality Control

The education quality is continuously monitored and evaluated. This is done by the faculty itself and by external organisations. The results of the evaluations are public. A summary of these results can be found on the internet.
Based on these results the education committee, together with the education director advises the dean.

Internal Quality Control:

- To evaluate the opinion of the students the "**SENSOR-course-evaluation-system**" (CENS) exists. This system gives all students the opportunity to give their opinion on the education anonymously. The study programme and courses are evaluated for each period. The results of evaluations can be found on the website, as well as the pass rates.
- Regular **Evaluations** with students and lecturers.
- Lodging of and dealing with **complaints**. These complaints can be lodged at the students association or at the education director.
- The faculty evaluates itself in a, so-called, self-assessment.
- The student association establishes "Lecture Response Groups". These groups publish, together with lecturers, in the 'Meer dan Konsumentengids' their comments on the courses. They also give a direct feedback to lecturers.

External quality control:

- The study is being examined by the VSNU (Association of Universities) every six years. This results in index numbers and efficiency performance indicators. For more information see www.vsnu.nl.
- Every six years the educational programme is examined and evaluated by the ABET (Accreditation Board for Engineering and Technology, in Baltimore, USA). This takes place on voluntary base.

3.8 Information services

This study guide is the main information source of the faculty and is available to all students at the study administration.
The website, however always contains the most recent information. Announcements, which are of importance for the study, like changes in the schedules, are made timely on the homepage of the faculty and at Black Board.
Schedules about the lectures, assignments and examinations are available at the desk of the study administration. At the homepage of the faculty and Black Board the changes in these schedules are given.
Information that is not related directly to the study e.g. information by students association S.G. 'William Froude', will be published on publication boards. Members of 'William Froude' will be kept informed by e-mail.

3.9 Rules and Regulations

Faculty regulations

- Students have to follow the instructions given by staff members. Staff members are those who support or give lectures and those who are responsible for buildings and the surrounding areas.
- On the first demand of a staff member the student should identify him- or herself by showing the campus card.
- The student should be present in time, before the start of a lecture, assignment, instruction or meeting. The lecturer or assistant may reject students who are late.
- Regular times for lectures to start are:

	start	end		start	end
1st lecture	8.45	9.30	5th lecture	13.45	14.30
2nd lecture	9.45	10.30	6th lecture	14.45	15.30
3rd lecture	10.45	11.30	7th lecture	15.45	16.30
4th lecture	11.45	12.30	8th lecture	16.45	17.30

- Bikes should be placed in the bike stands provided
- There is an opportunity to store personal belongings in lockers which are provided in the main hall. In the corridor situated next to lecture rooms A till F, bigger lockers can be used to store helmets. At the end of the study year, before the 15th of July, the lockers should be empty and the keys should be returned. Lockers, still in use after the 15th of July, will get a new lock on cost of the student.

- Eating and drinking is only allowed in the canteen, the coffee corner and in the immediate surroundings of a soda, candy, coffee or soup dispensers.
- Writing on, drawing on, sticking things on or scratching in furniture, walls, doors or windows is prohibited.
- Garbage and paper should be disposed in bins.
- For the use of computers, network connections, printers and plotters there are rules and regulations, which should be taken in consideration.
- Disobeying of rules and regulations can result in a suspension or a denial of certain facilities. Theft or destruction on purpose of properties of TU Delft and also serious misdemeanours (misdragingen) will be mentioned to the proper authorities.

Student Statute (Studentenstatuut)

The Education Specific Part Student Statute (OSDS) applies to the education and the exams of the study Marine Technology. The OSDS comes into force on 1 September 2002.
The OSDS defines which educational services are given by the faculty and what is demanded from the students. The OSDS intends to offer the students an easy way to accomplish improvements in the educational situation, with help of the education director.

The OSDS consists of:

- This Study Guide
- The Course and Examination Regulations for the study Marine Technology (CER, see appendix 6.3)
- Regulations and guidelines for the board of examiners (appendix 6.4)

Internet facilities

Using the internet facilities at the faculty is bound to some regulations:

<u>It is allowed to:</u>
Send e-mail to persons (or applications) from which can be expected that they will not consider the e-mail as annoying. Also you can receive e-mails which can be temporary stored in the inbox.
Read online magazines and to place articles in it.
Use the network information services like WWW-servers and FTP-servers, which are in use at this moment and also which will become available in the future. All use of services is bounded by regulations.
Use the "Intranet DUNeT" on telephones provided through the faculty.

<u>It is not allowed to:</u>
Use available facilities in any other way as they were supposed to be used.
Make excessive use of the facilities
Let a third party use available facilities
Do damage or obstruct other users or equipment linked to the world wide web.
Become member of a mailing list outside the faculty without permission of the "dutwmail director". This rule only counts for the students.

4 Facilities

The locations of facilities, as mentioned in this chapter, can be found at the faculty map in appendix 6.8. In this study guide is being referred to this map, with a number and a letter, which corresponds to a certain part of the building. The floor is also indicated (BG= ground floor, 1st = first floor, etc.).

4.1 Lecture Rooms

Lecture rooms are used for lectures, (graduation) presentations and instructions. The next table shows all the lecture rooms, their capacity and their location.

Lecture Room	Capacity	Location
A	300	6, BG
B	200	6, BG
C	150	6, BG
D	150	6, BG
E	70	6, BG
F	70	6, BG
J	50	8D, 1st
K	30	8G, 1st
L	30	8G, 1st
M	20	8B, 4th

4.2 Student work facilities

Study places

At several locations in the faculty individual study places are available. Some of these study places are equipped with computers. Every student can use such a place. It is not possible to make a reservation. No student has to vacate a study place for a fellow student. Places should be left clean and tidy.

Study places in the library

Besides the study places as mentioned above, there are also places to study in the library. Individual students can use these places. In the library students have to be silent. The same rules apply as for the study places.

4.3 Computer rooms

Besides computers at the different study places, there are computers available in the computer rooms. Each computer room is provided with a network printer. All computers give access to the internet. The computer rooms are sometimes in use for instructions or assignments. When they are, the computer rooms are not accessible for everybody. A schedule, on the door of each computer room tells when these instructions or assignments take place. If computer rooms are not in use for instructions or assignments, individual students can use them.
The next table shows all the computer rooms and their location.

Computer room	Location
Athena room	4, 1st
Parthemus room	4, 1st
Pallas room	4, 1st
IOP room	8G, BG

4.4 Research facilities

The faculty has a number of research laboratories for Marine Technology. Students may perform a part of their study e.g. the MSc-Thesis or an laboratory exercise in these laboratories. The laboratories are used for research activities of Ph.D.- Students and staff.

The different laboratories are:

Hydromechanics Laboratory

Facilities 140 m Towing tank
85 m Towing tank
Cavitation tunnel

Location: 7

Ship Structures Laboratory

Facilities Servo-hydraulics testing machines of different capacities
Data acquisition equipment
1000-tons test machine for large-scale fatigue tests

Location: 7

4.5 Library

Central library

The library of the TU Delft consists of a main building and smaller libraries in each faculty. The main building has a large collection of books, reference books and magazines. The main part of the collection can be lent from the library, a smaller part is only available within the library. The main part of the collection has to be requested and will be available at the desk within half an hour after requesting. The other part, like study books and lecture notes, is available in the bookcases in the back of the building. The main building has more than 1000 study places (at the ground floor, on the different floors of 'the cone' and in a couple of group rooms), a computer room and coffee and candy dispensers.
To lend a book, a student should posses a library card. This pass can be acquired at the desk in the main building or at the library of the student's faculty.

Opening hours

Monday to Thursday 9:00 - 0:00
Friday 9:00 - 18:00
Saturday and Sunday 10:00 - 18:00

Book desk

Monday to Thursday 9:00 - 18:45
Friday 9:00 - 16:45
Saturday 10:00 - 12:45

Books can be borrowed for a period of 28 days. This term can be extended as long as no other person makes a reservation for the book.

The central library is behind the auditorium (aula) at the Prometheusplein, see appendix 6.7.

Faculty Library

The faculty library is a part of the TU Delft library. It has a collection, specifically for Mechanical Engineering and Marine Technology. This doesn't mean that all books on these subjects can be found here. A part of the books on Mechanical Engineering and Marine Technology can be found in the central library. In the faculty library the lecture-notes and books, used in the study, are available. These books and lecture-notes are not lent out in general. The faculty library also offers places to study. Print and scan equipment is available and there are several recent technical magazines. The library is located at the ground floor in section 8D.

Opening hours

Monday to Friday 9:00 - 17:00

Request

Searching and requesting books is possible by the online catalogue at http://www.library.tudelft.nl. This catalogue includes all collections of all libraries of the TU Delft. Besides the catalogue, requesting of books is possible at the desk of the central library and the faculty library.

4.6 Selling point for lecture notes

Most lecture notes, which are used for lectures at the faculty, are for sale at the selling point for lecture notes.
Opening hours: Monday to Friday 12:00 - 15:00
Phone: 015 27 86766
The location is 10, 1st.

4.7 Mailbox and access to the internet

E-mail account

Each student has the possibility to communicate on the Internet. Therefore each student gets an e-mail account. This e-mail account is connected to the faculty server. It is also possible to use this account at home. Students also get an account on the NT-computers in the faculty. At these computers the student is able to access the Internet, print and use other network facilities.

Printing

Printing is paid for by a print account. Each student gets a welcome account of €11.50 to start with. At the reception desk the account can be upgraded, from 8:30 till 16:30.
It is possible to check the print account at all time, by pointing with the mouse on the 'dollar sign'-symbol in the taskbar at any computr at the faculty.

The services mentioned above are taken care of by:

Service information and automation (Dienst Informatisering en Automatisering) (I&A):
Managing of computers, servers and the network
Phone: 015 27 82001
E-mail: helpdesk@wbmt.tudelft.nl

ir.J. de Wilde:
Manager e-mail accounts
Phone: 015 27 83757
E-mail: j.dewilde@wbmt.tudelft.nl
Room: 7 – 1 – 120.

Service Technical Support (Dienst Technische Ondersteuning) (DTO):
Supporting when problems with accounts occur
Phone: 015 27 82000
E-mail: info@dto.tudelft.nl

4.8 Available software

Software on the working places

The student is able to use a large variety of software provided on the computers at the faculty. The table below shows all available software in the computer rooms, project tables and design studios.

	PC Rooms	Project tables	Design studios		PC Rooms	Project tables	Design studios
Data Analysis & Simulation Software				**Practical Software**			
Adams 10.1	x			Autocad 14	x		
Ansys 5.6	x			Autocad Lite 2002	x	x	x
GSP 9.101	x			BFP FlowSelect		x	
Maple 7	x	x	x	Blok Coëfficiënt			x
Matlab 6.1	x	x		Brooks		x	
Pro Engineer 2000 i2	x			Card	x		
Grafic Software				Carene			x
Coreldraw 9	x	x	x	CMS	x	x	
Internet Software				Costcomp		x	x
Eudora 5.01	x	x	x	DelftShip			x
Internet Explorer 6.0	x	x	x	Eagle 11.6			x
WS_FTP LE	x	x	x	E Balans			x
Program Languages				Evaluatie Design			x
Borland Pascal 7.0	x			Freeboard			x
Microsoft Visual Basic 6.0	x	x	x	Holtrop & Mennen	x	x	x
Tools				Massa Calculation			x
Acrobat Reader 5.0	x	x	x	Mathcad 5.0	x	x	
Flash	x	x	x	Microsoft Project		x	x
Mathtype 4	x	x	x	Pias			x
Powerarchiver 6.1	x	x	x	REBISlite		x	x
Qres	x	x		SKF	x	x	
Realplayer 8.0	x	x	x	Wtadsoc		x	
Shockwave	x	x	x	**SKA**			
TAS	x	x	x	Microsoft Frontpage 2000	x	x	
TNT Lite	x	x					
Wbalance	x	x	x	Microsoft Office 2000	x	x	x
Workpace	x	x	x	Sophos Antivirus	x	x	x

4.9 Catering

The faculty offers a variety of catering facilities.

Canteen The faculty canteen serves a comprehensive lunch. The canteen can be found at location 10, BG.

Coffee corner The coffee corner is specialised in a quick snack. The coffee corner is situated in the main hall (8F). Chairs and couches are available. Opposite of the coffee corner there are dispensers for serve coffee, candy bars, sodas and soup. Paying at these dispensers is only possible by using a chipknip.

Faculty room The faculty room is a place for giving symposia, meetings or graduation drinks ("afstudeerborrels"). A reservation can be made at the reception desk (6).

Lagerhuysch The Lagerhuysch is situated in the cellar beneath section 8B. There is an access on the square in front of the faculty. The Lagerhuysch offers the possibility for giving graduation drinks (afstudeerborrels), but also for organising symposia and meetings. The students associations Gezelschap Leeghwater and William Froude regularly organise a reception.
On the site http://www.lagerhuysch.tudelft.nl a route description and a reservation form for the Lagerhuysch can be found.

Auditorium Within the TU Delft auditorium a variety of catering facilities is available. Lunch time is from 11.30 till 13.30, diner time from 16.30 till 19.30. See appendix 6.8 for the location of the auditorium.

5 TU - Services for students

The TU Delft provides several service centres for students:
- Student Service Centre (SSC)
- Sports Centre
- Cultural Centre TU Delft 'Mekelweg 10'
- Library TU Delft

For all other services: refer to the TU Delft website, http://www.tudelft.nl.

Student Service Centre

The Student Service Centre consists of several departments, which provide a diversity of services to students, staff members and faculties.

Some examples of these services are provision of information concerning:
- Studying abroad
- All possible forms of education at the TU Delft
- Study support and advise
- Housing
- Financial support and sponsoring for students and student associations

Student Service Centre
Julianalaan 134
2628 BL Delft
Postbus 5
2600 AA Delft
Phone: 015 27 86311
Fax: 015 27 86498
http://www.ssc.tudelft.nl

Sports Centre

The Sports Centre provides all kinds of sports facilities:
- Indoors, this means accommodation in different halls and gyms, in which almost any kind of sport can be done.
- Courses and trainings organized by professional instructors.
- Outdoors there are 12 tennis courts and (natural) grass fields for playing soccer, hockey, cricket, rugby, baseball and softball. Most of these fields are illuminated during evenings.

Also it is possible to use the facilities on an individual basis.

Sports Centre
Mekelweg 8
2628 CD Delft
Phone: 015 27 82443
Fax: 015 27 87087
http://www.sc.tudelft.nl

Cultural Centre TU Delft 'Mekelweg 10'

Anyone who likes to express oneself in an artistic manner can do this is at the Cultural Centre. There are numerous possibilities, differing between darkrooms to rehearsal and Dee Jay-studio.

The facilities are:
- Design studios
- Several studios for midi and Deejay's
- Darkroom for photography
- Video editing room
- Rehearsal room for musicians

Cultural Centre TU Delft 'Mekelweg 10'
Mekelweg 10
2628 CM Delft
Phone: 015 27 83988
Fax: 015 27 83946
http://www.cc.tudelft.nl

ICT Infrastructure

Infrastructure services, concerning telephony and ICT facilities are provided by DTO (Technical Support Service). Services concerning students, as described at http://www.dto.tudelft.nl are:

Internet facilities for student accommodation
A number of internet acces facilities for student accommation are offered by the TU Delft.

OLI
OLI is a foundation that supports students, by offering internet facilities, e.g. to exploit websites. This is possible for all kind of student organisations, like student associations, study associations, student's houses, etc.
http://www.oli.tudelft.nl

6.1 Course description

mt112	Ship Design 3				
Lecturer	Boonstra, ir. H.				
Course material	Handouts				
Description	Recent developments in the design of maritime objects are reviewed under the general theme of reliability, innovation and economy. The majority of the subjects in these lectures are treated in a seminar form: each of the students presents a part of the subject. One or two guest lecturers from the industry are invited.				
Education	Lecture 4/0/0/0		**Credits**	**TU**	2
Assesment	Oral			**ECTS**	3

mt113	Ship Design 4				
Lecturer	Frouws, ir. J.W., Stapersma, prof.ir. D., Keuning, dr.ir. J.A.				
Course material	Pinkster, J., "Introductie Geavanceerde Vaartuigen", 1998 Kopieën van publicaties over relevante onderwerpen				
Description	Introduction to advanced marine vehicles, propulsion systems, ship motions, materials, strength of materials, safety aspects, ship owner's requirements and economics, design of advanced marine vehicles				
Education	Lecture 0/4/0/0		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

mt212	Marine Engineering B				
Lecturer	Klein Woud, prof. ir. J.				
Course material	Klein Woud, J. "Maritieme Werktuigkunde B, 2002				
Description	Shafting dynamics, torsional and axial vibrations in (diesel engine) drive systems. Whirling vibrations. Shaft alignment. Flexible mounting of equipment. Vibration and noise isolation. Balancing of piston engines.				
Education	Lecture 2/0/0/0		**Credits**	**TU**	2
Assesment	Oral			**ECTS**	3

mt213	Marine Engineering C				
Lecturer	Grimmelius, ing. ir. H.T.				
Course material	Lecture Notes				
Description	Maintenance concepts. Relation with Life Cycle Costs. Reliability, Availability. Fault tree analysis. Condition monitoring.				
Education	Lecture 0/2/0/0		**Credits**	**TU**	1
Assesment	Written			**ECTS**	1.5

mt216	Internal combustion engines				
Lecturer	Klein Woud, prof. ir. J.				
Course material	J. Klein Woud, Marine Engineering; Design of Propulsion and Electric Power Generation Systems				
Description	Piston Engines (Diesel and Otto) and gas turbines. Working principles. Indicator Diagram. Ignition and Combustion. Performance. Pressure charging. Introduction to thermodynamic analysis. Construction. Operating envelope. Fuels.				
Education	Lecture 0/0/0/4		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

mt313	Shipping management				
Lecturer	Meersman, prof. dr. H., Voorde, prof. dr. E. van de				
Course material					
Description	De werkwijze hiervan is als volgt: de student kiest in overleg met de professoren een onderwerp dat hij/zij wil uitdiepen; de student(e) wordt op weg gezet, d.i. hij/zij krijgt bibliografische referenties en suggesties i.v.m. lopend (internationaal) onderzoek; er worden een aantal 'hearings' georganiseerd waarop de eventuele problemen worden besproken; de student(e) verdedigt voor de groep een zelf uitgewerkte paper over het gekozen onderwerp.				
Education	Lecture 0/0/4/0		**Credits**	**TU**	2

Assesment	Rapport	Presentation		**ECTS**	3

mt411	**Offshore 2**
Lecturer	Boonstra, ir. H.
Course material	Boon, B. and Boonstra, H. "Het ontwerpen van Maritieme Offshore Constructies II", 1991
Description	Application of marine technology in the design of floating offshore platforms, including wave loading, hydrostatic stability, motions in waves, structural strenght, logistics, deck lay-out, safety. Analysis of catenary mooring systems and of riser systems. Criteria and requirements posed by offshore industrial activities, platform owners, construction yards, authorities.

Education	Lecture 4/0/0/0		**Credits**	**TU**	2
Assesment	Written or assignments			**ECTS**	3

mt514	**Ship Motions and Control 3**
Lecturer	Pinkster, prof.dr.ir. J.A.
Course material	Gerritsma, prof. J., Scheepsbewegingen, sturen en manoeuvreren 2 Pinkster, prof.dr.ir. J.A., Wave drift forces
Description	Manoeuvreren en Sturen.Verdieping theorie manoeuvreren van schepen en andere objecten. Lineaire modellen, niet-lineaire modellen. Model proeven ter bepaling van coëfficiënten voor lineaire en niet-lineaire mathematische modellen. Stoppen en versnellen van schepen. Invloed van beperkte waterdiepte en beperkte breedte van een vaarwater. Onderlinge beïnvloeding van schepen. Simulatoren. Scheepsbewegingen. Verdieping theorie van scheepsbewegingen. 3-dimensionale diffractie theorie. Strip theorie. Gedrag van afgemeerde offshore constructies. Niet-lineaire golfdriftkrachten.

Education	Lecture 0/0/0/4		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

mt515	**Resistance and Propulsion of Ships 3**
Lecturer	Terwisga, prof.dr.ir. T. van
Course material	Handouts
Description	Profile theory and profile design. Unsteady lifting surface analysis and design of propellers. Panel codes for the design and analysis of propellers. Effective wake calculations. Cavitation and scale effects on cavitation. State of the art in Navier Stokes calculations of the flow around the hull and wake. Special propulsors

Education	Lecture 2/2/0/0		**Credits**	**TU**	2
Assesment	Presentation			**ECTS**	3

mt523	Numerical methods for MT				
Lecturer Course material					
Description					
Education Assesment			Credits	TU ECTS	

mt524	Hydromechanics of special ship types				
Lecturer Course material					
Description					
Education Assesment			Credits	TU ECTS	

mt724	Ship finance				
Lecturer Course material	Nienhuis, prof.dr.ir. U. Sources as accountants and banks: KPMG, Moret, Ernst & Young, NIB, etc., Shipping desks, Research institutes				
Description	Costprice, exploitation, budgetting, marketing, costs and tarifs, rentability, finance, courses of exchange, internal and external companyfactors for shipowners and yards.				
Education Assesment	Lecture 0/2/0/0 Written	Presentation	Credits	TU ECTS	2 3

mt725	Inland shipping				
Lecturer	Dirkse, ir. C.				
Course material	S.Hengst, "Binnenvaart in beeld" (in Dutch) Delft University Press				
Description	The position of inland shipping in Europe, ship types and their background Choice of ship type and equipment Logistic chains, cargo varyity, optimisation. Regulations and legislation on European waterways Relation ship - waterway New shiptypes Design and construction; new developments in inland shipping				
Education	Lecture 0/2/0/0		**Credits**	**TU**	1
Assesment	Report			**ECTS**	1.5

mt726	Project management				
Lecturer	Nienhuis, prof.dr.ir. U.				
Course material	Leeuw, prof. dr. ir. A.C.J. de Een boekje over bedrijfskundige methodologie" Kaizen, Imaki Masai, Ship Production, Th.M.J. van Rijn, Produceren door informeren H. Botter, Produktie management ISO-9000 t/m 9004.				
Description	Marketfactors, strategic planning, budgetting, operational research, production optimation, problem analysis, quality management, organisation and execution of repairs and salvage, scrapping, expertise, insurance, single production, production control, planning systems.				
Education	Lecture 0/4/0/0		**Credits**	**TU**	3
Assesment	Essay	Presentation		**ECTS**	4.5

mt727	Shipyard process simulation & strategy				
Lecturer	Nienhuis, prof.dr.ir. U.				
Course material					
Description	Strategy, costing, investment decisions, operational research, logistics, characteristics of one-of production, internal and external process parameters, market parameters, quality control, business process simulation, business process optimization, international factor cifferences (labour, capital, material, productivity, etc), productivity indices.				
Education	Lecture 0/0/2 or 4/0		**Credits**	**TU**	3
Assesment	Report	Presentation		**ECTS**	4.5

mt728	Ship repair and salvage				
Lecturer	Nienhuis, prof.dr.ir. U.				
Course material					
Description	Ship repair is an uncertain business with strong fluctuations in contracted work. Competition put pressure on the rates and environmental requirements raise the cost. Saving of manhours by introduction of innovative systems and careful jobpreparation and -control are topic is the business.A high level of craftmanship and flexibility of the organisation are required. Salvage is even more uncertain and requires an organisation which can bring together the required material and expertise in a very short time. Sometimes unconventional technical solutions have to be applied.				
Education	Lecture 0/0/2/0		**Credits**	**TU**	2
Assesment	Report			**ECTS**	3

mt814	Vibrations and noise in ships				
Lecturer	Hylarides, prof.dr.ir. S.				
Course material	Lecture notes				
Description	Further to the basic aspects of vibration and noise, as dealt with in mt832 and mt835, a more comprehensive presentation is given of the calculations related to noise and vibrations of ships. Subjects: vibration control, local vibrations, vibrations of sub-structures, propeller excitation of the hull, propeller noise, noise control, noise level prediction.				
Education	Lecture 0/0/4/0		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

mt815	Construction & strength special subjects				
Lecturer	Vink, ir. J.H., Hommel, ir. G.				
Course material					
Description	Three advanced topics in the field of ship and offshore structures will be dealt with each year. · Each odd week, a topic is introduced by an expert during a lecture of 3 hrs. · Subsequently, the students have to work in groups on a task as defined by the expert. · The results of the task are presented and discussed in the next evenweek.				
Education	Lecture 0/0/3/0		**Credits**	**TU**	1.5
Assesment	3 tasks			**ECTS**	2.25

mt816	Composite materials for ship construction				
Lecturer	Leenders, ir. W.S.				
Course material	Summaries; course-book in preparation.				
Description	Applications in marine structures, material components, physical and mechanical properties, production methods, structural concepts, sandwich, stiffening, joints and attachments, strength and stiffness, static and dynamic strength, response and capability, rules and regulations.				
Education	Lecture 0/0/0/x		**Credits**	**TU**	1
Assesment	Case			**ECTS**	1.5

mt830	Applications finite elements method				
Lecturer	Hommel, ir. G.				
Course material	Finite Element Modeling for Stress Analysis, Cook,R.D., ISBN 0-471-10774-3				
Description	application and user aspects, modeling procedures, advanced elements, elastic kernel, errors and accuracy, recent developments, commercial software				
Education	Lecture 0/0/0/4		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

mt835	Integration loads and strength				
Lecturer					
Course material					
Description					
Education			**Credits**	**TU**	
Assesment				**ECTS**	

wm0732tu	Law for Marine Technology				
Lecturer	Wijting, mr. W., mr. K. Festen-Hoff , mr. ir. A. Rijlaarsdam				
Course material	Lecture notes wm0732mt first part and help book edition 1996. Obtainable from bookshop TBM.				
Description	In later profession but also during their study the maritime technologist will often come into contact with international and national law. In daily life one needs law for example when one buys a personal computer or instruments, enters or leaves employment service, or has to settle damage caused in traffic. The maritime engineer will (dependent on his job) have to do with cases as contracts about shipbuilding and -reparation, mortgage on ships, contracts on charter and transport, average and the consequences of it.				
Education	4/0/0/0		**Credits**	**TU**	2
Assesment	Written			**ECTS**	3

6.2 Study and traineeship abroad

Study abroad offers a lot of attractive prospects. You become acquainted with a different (organisational) culture, a different university life and a different educational system. Besides you enlarge your personal network, you learn to live within a foreign environment, and you improve your knowledge of languages. To put it briefly: a period of study abroad will make a valuable contribution to your personal education and you will draw much benefit from it at your search for a proper job.

You can make use of one of many exchange agreements with European and non-European universities for your study at a foreign university. Within such an agreement you do not pay the foreign university any tuition fee. In addition to this, grants are available for financing the additional expenses for staying abroad. For your first information on studying abroad it is recommended to visit the Information Centre of the Student Advisory Office. The Student Advisory Office is part of the Student Service Centre (paragraph 5.1). Much documentation about study abroad is available at this Centre, like information on all universities with which an exchange agreement exists, possibilities of financing, and travel reports from students. Also information is available at the website: http://www.stad.tudelft.nl.

If you got a clear idea about where you want to go to, you can ask the Coordinator for International Exchange Marine Technology for advise about your programme at the foreign university and about the recognition of your results at the host university. Your graduation professor will judge your work afterwards according to the rules you agreed upon prior to departure.

The foreign programme should at least contribute 8 credit points to your MSc programme. To arrange everything you have to do a lot yourself. Therefore you have to take a preparation period into account of preferably a year, but at least half a year.

Traineeship

Usually a traineeship is arranged via one of the staff members of the section to which your specialization belongs. In addition to this you can visit the Information Centre of the Student Advisory Office (see above). They offer a lot of information, not only on a large number of companies abroad, but also on financially related affairs, working permits, visa, etc. Additional information is available at the website: http://www.stad.tudelft.nl.

Coordinator for International Exchange Marine Technology
dr.ir. D. Nijveldt
Room 8B – 3 - 08
Mekelweg 2
2628 CD Delft
Phone: 015 27 85921
Fax: 015 27 88340
E-mail: d.nijveldt@wbmt.tudelft.nl

6.3 Course and Examination Regulations

(CER)

(art. 7.13 W.H.W.*)*

Master's degree programme Marine Technology

Faculty of Mechanical Engineering and Marine Technology

Delft University of Technology

Section 1 GENERAL

Article 1 SCOPE AND APPLICABILITY OF THESE REGULATIONS

1. These regulations are applicable to teaching and examinations of the Master's degree programme Marine Technology at Delft University of Technology, hereafter referred to as *the programme*.
2. These programmes are conducted under the responsibility of the Faculty of Mechanical Engineering and Marine Technology at Delft University of Technology, hereafter referred to as *the Faculty*.
3. For this programme, implementation procedures are in effect that supplement, and are integral to, these Course and Examination Regulations.
4. The Course and Examination Regulations and the implementation procedures are laid down by the Dean.

Article 2 DEFINITIONS

Any terms in these regulations also occurring in the Higher Education and Academic Research Act (WHW) will have the same meaning as that intended by that Act.

In these regulations, the following terms shall be understood as follows:

a. the Act: the Higher Education and Academic Research Act (abbreviated in Dutch to WHW), including its subsequent amendments;
b. programme: the Master's degree programme referred to in Article 7.3a, subsection 1 under b of the Act;
c. student: anyone enrolled at Delft University of Technology (as a student or "extraneus") for purposes of education and/or for taking the examinations and interim examinations that are part of the programme;
d. practical training: practical exercise as referred to in Article 7.13, subsection 2 under d of the Act, in one of the following forms:
   - writing a thesis;
   - writing a paper/completing an assignment, project or technological design;
   - completing a design or research assignment;
   - conducting literature study;
   - completing a work placement;
   - taking part in fieldwork or an excursion;
   - conducting tests and experiments;
   - or participating in another educational activity focused on the attainment of a particular skill.
e. interim examination: a test of a student's knowledge, insight and skills with regard to a particular unit of study, and the assessment of this examination by at least one examiner appointed for that task by the board of examiners.
h. examination: test used by the board of examiners to establish whether all interim examinations that are part of the *propedeuse* (i.e. first year), *kandidaats* or *doctoraal* phases have been successfully completed as specified in Article 7.10 of the Act.
i. board of examiners: the board of examiners as appointed according to Article 7.12 of the Act.
j. implementation procedures: the implementation procedures integral to the Course and Examination Regulations and applicable to a specific Master's programme.
k. working day: each day from Monday to Friday, with the exclusion of official national holidays.
l. course calendar: the publication containing all the specific information appropriate to a specific Master's course guide named in Article 1.

m. examiner: those appointed by the board of examiners for the purpose of taking interim examinations in accordance with Article 7.12 of the Act;
n. ECTS: credits as specified in the European Credit Transfer System
o. The University: Delft University of Technology

Article 3 OBJECTIVE OF THE MASTER'S PROGRAMME MARINE TECHNOLOGY

This Master's programme is intended to prepare graduates in Marine Technology for the practice of engineering at an academic level,

- capable to identify, define and analyse problems, for the solution of which Marine Technology principles and techniques can contribute
- capable to systematically design and produce a sound solution to the problem
- capable to present this solution in a convincing way.

Article 4 ADMISSION TO THE MASTER'S PROGRAMME

1. Admission to this programme will be granted to students in possession of a degree issued for the Bachelor's programme in Marine Technology issued by the TU Delft.
2. Students who are not graduates of the course specified in paragraph 1 but who are in possession of a confirmation of admission provided by the Faculty will be eligible for admission.
3. To obtain confirmation of admission, a student must satisfy the criteria specified in paragraph 1.4 of the study guide.
4. If so requested by a student who is not in possession of the Bachelor's degree as specified in paragraph 1, the board of examiners may depart from paragraph 1 by allowing that student to attend parts of the Master's programme.

Article 5 EXIT QUALIFICATIONS OF THE MASTER'S PROGRAMME MARINE TECHNOLOGY

The Master's programme Marine Technology has the following exit qualifications:

Graduates will:

- have broad and deep knowledge of the basic engineering sciences
- have broad basic technical and scientific knowledge of the mechanical engineering disciplines: production, transport, process technology, energy conversion and mechatronics
- be specialized in at least one mechanical engineering discipline
- be able to innovate, to model and to design systems and equipment
- be able to contribute to solving multidisciplinary problems and to work both in multidisciplinary teams and independently in an international industrial context
- be able to communicate effectively with team members and environment
- be well aware of their responsibilities with regard to sustainability, economy, health, safety and social welfare
- be able to maintain professional competence through life-long learning

Article 6 FULL-TIME AND PART-TIME COURSE FORMATS

The Master's programme will be provided on a full-time basis.

Article 7 LANGUAGE

1. English shall be the language used for all teaching and examinations.
2. In certain cases, the Dean may depart from paragraph 1 by giving permission for teaching to take place in Dutch, if this is necessitated either by the specific nature of the organisation, the quality of the course, or the students' origins and backgrounds.
3. If a student asks to be allowed to take one component, or several components, of an examination in a language other than English, the terms of the regulations and the guidelines of the board of examiners will be applicable accordingly.

Section 2 COMPOSITION OF THE MASTER'S PROGRAMME AND THE FINAL EXAMINATION

Article 8

1. The composition of the educational programme is laid down in the implementation procedures. This educational programme starts once a year, in September.
2. Students can enter the programme at the beginning of each semester.
3. The examination for a Master's Degree is an integral part of the programme. The study load for this examination totals 84 credits (120 ECTS).

Section 3 INTERIM EXAMINATIONS

Article 9 THE NUMBER, PERIOD AND FREQUENCY OF INTERIM EXAMINATIONS

1. a. The course shall provide at least two opportunities per year to sit interim examinations:
   - the first shall follow immediately after the teaching period in which the relevant component was taught and completed;
   - the second shall be given at the end of the second semester, or otherwise in the August resit period.

   b. The interim examinations referred to under a. shall be held as indicated for the unit of study concerned in the timetable for the current academic year. At the beginning of each academic year, a timetable specifying the dates and times of written interim examinations shall be drawn up and published.

2. In the event that a course component is not taught within the Faculty itself, and therefore there is no indication of the number of times it is possible to sit an interim examination as referred to in paragraph 1, the course and examination

regulations of the relevant Faculty or degree programme will be applicable, provided no decision to the contrary has been taken by the board of examiners.
3. Notwithstanding the provisions of the first clause under 1a, at least one opportunity shall be given per year to take an interim examination in a course component that has not been taught in that year.
4. In certain cases the board of examiners may allow departures from the specified number of times that an interim examination can be sat.

Article 10 THE ORDER OF INTERIM EXAMINATIONS

The implementation procedures shall specify the order in which the interim examinations will be taken, or in which students be to participate in practical training.

Article 11 THE PERIOD OF VALIDITY OF INTERIM EXAMINATIONS

1. Students who have interrupted their studies, or who have delayed their studies for other reasons, shall resit any component they passed ten years or more ago if its contents have since been modified.
2. The board of examiners may, in a student's favour, depart from the provisions of paragraph 1.

Article 12 THE FORM OF THE INTERIM EXAMINATIONS, AND THE METHOD OF TESTING

1. The interim examinations be sat as specified in the implementation procedures. Practical skills be tested during the hours allocated for practical training.
2. If no specification is made of the way in which an interim examination can be taken, because that examination applies to a unit of study that is not taught within the Faculty, and because it involves a unit of study that is not specific to students taking part in a programme administered by the Faculty of Mechanical Engineering and Marine Technology, the relevant conditions in the Course and Examination Regulations for that unit of study shall be applicable. Each year, the board of examiners under which the interim examination falls shall determine the way in which the interim examination is to be taken.
3. The appointed examiner may depart from the provisions of paragraphs 1 and 2 in a student's favour.
4. Each student with a physical or sensory disability shall be given the opportunity to take all interim examinations and practical training in a way that, to the greatest possible extent, is adapted to the disability in question. Under this facility, the form or length of the interim examinations shall be adapted to the individual situation, or practical aids shall be made available.
5. The facilities specified in the previous paragraph should be requested from the board of examiners by the student concerned. This request should be accompanied by a medical certificate issued no more than one year previously by a doctor, psychologist or student counsellor. All requests involving dyslexia should be backed by a recognised dyslexia testing body.
6. Per year, the form in which each interim examination is to be taken shall be specified in the study guide for the actual course year under the unit of study concerned.
7. Per year, the form in which each interim examination is to be taken shall be specified in the study guide for the actual course year under the unit of study concerned.

Article 13 ORAL INTERIM EXAMINATIONS

1. Unless otherwise determined by the board of examiners, no oral interim examination shall involve more than a single student at the same time.
2. All oral interim examinations be public, unless, in exceptional circumstances, the board of examiners or the individual examiner decide otherwise, or if the student has submitted an objection.

Article 14 THE ESTABLISHMENT AND NOTIFICATION OF RESULTS

1. Immediately after taking an oral interim examination, the examiner shall announce the result, and issue the student with the relevant written notification.
2. As soon as possible after a written interim examination, and always within a maximum of 15 working days, the examiner shall declbe the results. The examiner shall provide the Faculty's student administration office with the necessary details. Paying all due attention to the privacy of individual students, the student administration office shall take responsibility for the registration, publication and reporting of the results within 20 working days of the interim examination.
3. If an interim examination is taken neither in writing nor orally, but in another form, the board of examiners shall decide in advance on the way in which students will be notified of the results, and of the period within which this will occur.
4. When students be provided with written notification of the results of an interim examination, it shall at all times be made clear that they have the right to inspect the relevant examination documents (as defined in Article 15), and that they have the right to appeal to the examination appeals board.

Article 15 CANDIDATES' RIGHT TO INSPECT THEIR EXAMINATION DOCUMENTS

1. For at least one month after the results of a written examination have been announced, it shall be possible for students to inspect their examination and its assessment. At the student's request, he/she will be provided with a copy of the relevant work at cost price.
2. During the period specified in paragraph 1, it is possible for all interested parties to inspect the questions and assignments of the relevant interim examination, and also the norms whereby assessment took place. Upon request a copy of this information shall be provided at cost price.
3. The board of examiners may specify that inspection of examination documents will take place at a predetermined place at no fewer than two predetermined times. The place and dates shall be stated on the list of results.
   If a student can demonstrate that, due to forces beyond his or her control, it was impossible to be present at the predetermined place and time, a new opportunity shall be provided; if possible, this shall fall within the period specified in paragraph 1.

Article 16 OPTIONS FOR DISCUSSING THE RESULTS OF AN INTERIM EXAMINATION

1. As soon as possible after the results of an interim examination have been announced, student or examiner may take an initiative towards discussing the examination, and to explaining its assessment.
2. For a period of one month, starting on the day following the announcement of the results, a student who has taken a written interim examination may apply to the relevant examiner to discuss the work in question. This discussion shall follow at a place and time specified by the examiner, and always within a reasonable period.
3. If, for whatever reason, the board of examiners organises a collective discussion after an interim examination, there be only two cases in which a student may submit a request of the type specified in the previous paragraph: either a. by being present at the collective discussion and by simultaneously providing the motives for the request; or b. when, due to circumstances beyond his or her control, it was impossible to attend the collective discussion.
4. The conditions of the previous paragraph shall also apply if the board of examiners or the examiner provides the student with an opportunity to compbe his or her answers with standard answers.
5. The board of examiners may allow deviations from the stipulations of paragraphs 3 and 4.

Section 4 EXEMPTION FROM INTERIM EXAMINATIONS

Article 17 EXEMPTION FROM INTERIM EXAMINATIONS OR PRACTICAL EXERCISE

1. The board of examiners can grant students exemption from one or more interim examinations or practical exercises, if they have satisfied the examiners either with regard to earlier interim examinations, or with regard to Higher Education examinations, or with regard to knowledge and skills acquired outside higher education. However, this is possible only if they satisfy at least one of the following conditions:
   a : the interim examination involved a unit of study that, in terms of content and study load, was equivalent to a comparable university course in the Netherlands or beyond, or at an institute of professional education (i.e. HBO institute / hogeschool) in the Netherlands.
   b: the student can provide proof of knowledge or experience acquired either during a course provided somewhere other than at a Dutch institute of professional education, or otherwise during activities conducted in another context.
2. If the relevant examiner has made a fully motivated proposal to this effect, the board of examiners may grant exemption from an interim examination.

Section 5 THE MASTER'S EXAMINATIONS

Article 18 PERIODS AND FREQUENCY OF EXAMINATIONS

1. An opportunity to take the Master's examination shall be provided no less than twice a year. In a meeting held before the start of the academic year, the board of examiners shall establish the dates on which the examinations be to be held. These shall be published in the study guide for the programme and year in question.
2. All students can apply to take the examinations as soon as they have fulfilled the conditions of their course, and have provided the student administration office with proof of the course components they have passed.

Article 19 REPORTING ON STUDENTS' PROGRESS

1. At least twice a year, each student shall be sent a written report on the progress he or she has made over the preceding period.
2. The report referred to in paragraph 1 shall be composed according to the guidelines established by the Executive Board.
3. The Dean shall be responsible for supervising the progress of all students enrolled on the course. Such supervision shall include an assessment of the options for study that be available to students, both inside the programme and beyond it.

Section 6 PROVISIONS FOR IMPLEMENTATION

Article 20 MODIFICATION OF THE REGULATIONS

1. These regulations may be modified in a special decision by the Dean.
2. No decision shall be made in respect of the current academic year, unless, by all reasonable definitions, it is unlikely to damage the interests of students.
3. No change in the regulations may negatively affect a previous decision made by the board of examiners in respect of a student.

Article 21 TRANSITIONAL RULING

1. In the event that the composition of a teaching programme is modified, or that one of the Articles of the Course and Examination Regulations is changed, the Dean shall decide on a transitional ruling, which shall then be published in the implementation procedures.
2. In all cases, this transitional ruling shall incorporate the following:
   a. a ruling on the exemptions that be available on the basis of interim examinations that a student has already passed,
   b. the number of times that it is still possible to sit for interim examinations under the conditions of the old programme,
   c. the period for which the transitional ruling will be valid.

Article 22 PUBLICATION OF THE TRANSITIONAL RULING

1. The Dean shall take responsibility for publicising the following in an appropriate fashion: the transitional ruling defined in Article 21, and the implementation procedures and the changes to it.
2. The Course and Examination Regulations and the implementation procedures for each course shall be incorporated in the study guide.

Article 23 DATE OF COMMENCEMENT

These regulations shall come into force on 1 September 2002.

IMPLEMENTATION PROCEDURES

for the course and examination regulations appropriate to the Master's programme Marine Technology

Article 1 COURSE CALENDAR

The course calendar for the programme can be found in the Study Guide for the Master's degree programme Marine Technology.

Article 2 COMPOSITION OF THE PROGRAMME

The composition of the Master's degree programme Marine Technology, including number of credit points, assessment, entrance requirements per unit of study is described in the Study Guide.

Article 3 COMPOSING FLEXIBLE STUDY PROGRAMMES

1. Students may themselves compose an individual study programme that will lead to an examination. This programme must consist, either in full or for the greater part, of units of study which be taught on the course they be attending, and may be supplemented with units taught on other courses or at other universities.
2. Each student desiring to compose a programme of the sort referred to in paragraph 1 shall submit his or her own proposal, motivating it in full, for the approval of the relevant board of examiners, i.e. at the beginning of the Master's programme.

Article 4 PROCEDURE FOR APPROVING FLEXIBLE STUDY PROGRAMMME

1. No less than two months before they intend to start on a flexible study programme, all students must submit their proposals for their choices of one or more units of study (as referred to in Article 3) for approval by the board of examiners. Each proposal must be accompanied by a clearly argued motivation.
2. Any decision not to approve the proposal shall be motivated by the board of examiners after the student in question has been given the opportunity of a hearing.
3. The board of examiners shall decide within twenty working days of receiving the application, or, if the application is submitted during an academic holiday, no more than ten working days after this holiday has ended.
4. The board of examiners can adjourn its decision for no more than ten working days. The student shall be given written notification of such adjournment within the twenty-working-day period referred to in the first sentence of paragraph 3. The student shall receive written notification of the decision without delay.

Article 5 THE ORDER OF INTERIM EXAMINATIONS AND ASSIGNMENTS

The order in which the interim examinations will be taken, assignments shall be fulfilled or in which students be to participate in practical training, is laid down by means of entrance requirements, specified in the description of the contents of the programme in the Study Guide.

Article 6 MASTER'S THESIS

The programme is concluded by fulfilling a final assignment and presenting a Master's thesis.

Article 7 VARIANTS AND ANNOTATIONS

1. The Marine Technology MSc-programme is provided in two variants:
   - Science
   - Design, Production and Operation
2. As an addition to the variant programme there are three annotations. After completing such an annotation, the student acquires a supplement to the MSc-degree, which declares a more than average knwoledge about that subject. These annotations are:
   - Technology in Sustainable Development .
   - Technical Marketing
   - Offshore Technology
3. Further details and requirements are laid down in the study guide.

Article 8 PARTICIPATION IN THE PROJECT "TU DELFT HELPS REDUCE THE SHORTAGE OF TEACHERS"

Within the framework of the project "TU Delft helps reduce the shortage of teachers in Dutch pre-university education", students can take part in the course "TU Delft/Teachers for schools". This course comprises two parts, a preparatory course and a supervision phase. The total course leads to the award of six credits (9 ECTS), which should be allocated within the elective subjects.

Laid down by the Dean of the Faculty Mechanical Engineering and Marine Technology d.d. 26-6-2002, after the approval of the Faculty's Student Council d.d. 26-6-2002, and after considering the recommendations provided by the education committee on 10-6-2002.

6.4 Regulations and guidelines for the board of examiners

(art. 7.12 W.H.W.)

Delft University of Technology

Faculty of Mechanical Engineering and Marine Technology

Master's programme in Marine Technology

Article 1 SCOPE OF THE REGULATIONS

These regulations and guidelines are applicable to the teaching of, and examinations for, the Master's degree programme in Marine Technology, hereafter referred to as *the programme*.

Article 2 DEFINITIONS

1. When used in these regulations and guidelines, the term Course and Examination Regulations (CER), refers to the current course and examination regulations as intended under Article 7.12 of the Higher Education and Academic Research Act (abbreviated in Dutch as WHW):
2. All other terms occurring in these Regulations will have the same meaning as that intended in the CER and the WHW.

Article 3 DAY-TO-DAY ADMINISTRATION

The board of examiners consists of the lecturers who are engaged in the educational programme and mentioned as such in the curricula, described in section 1.5 of the study guide. The board of examiners shall appoint a chair and a secretary from its members. The chair shall be responsible for the day-to-day management of the committee.

Article 4 ENTRY FOR INTERIM EXAMINATIONS

1 Students shall apply for interim examinations at the Faculty's Department of Educational and Student Affairs by entering data in the examination application system, or, if the system is not in use, by submitting a form made available by the Department of Educational and Student Affairs. Whatever the means of application, all submissions must be received no less than ten working days before the interim examination.

2 In exceptional cases, the board of examiners can depart from the application period defined in paragraphs 1 and 4 of this Article, provided that this departure is in the favour of the student concerned.

3 Admission to the interim examination will be granted solely to those students who are registered on the list of applicants produced by the examination application system (or by any alternative system currently in force).

4 If, in their opinion, students have not been able to apply for an interim examination due to events beyond their control, they shall apply to the board of examiners no less than two full working days before the day for which the examination is planned. By submitting a declaration of demonstrable *force majeure* written or issued by, or on behalf of, the board of examiners, the student may be allowed to sit the relevant examination.

Article 5 ORDER DURING AN INTERIM EXAMINATION

1 With regard to written interim examinations, the board of examiners and/or the appointed examiner shall be responsible for appointing invigilators who, on behalf of and under the authority of the board of examiners will ensure that the examination runs smoothly.
2 If asked by, or on behalf of, the board of examiners, all candidates shall identify themselves by showing their campus card.
3 Candidates shall observe all instructions that have been published before the start of the examination by the board of examiners, or by the examiner or invigilator. They shall also follow instructions given during the examination and immediately after it has finished.
4 If a candidate fails to fulfil the conditions of the paragraphs 2 and 3 of this Article, the board of examiners or the appointed examiner can exclude him or her from further participation in the interim examination. The consequence of such exclusion is that no result is established for the examination in question. Before taking such a decision, the board of examiners shall offer the student concerned an opportunity to state his or her case.
5 The time allotted for each interim examination shall, by all reasonable standards, be long enough to allow candidates sufficient time to answer its questions.
6 When the interim examination has finished, candidates may keep the assignment papers. The exception to this rule concerns examinations in which questions and answers must be handed in together.
7 Candidates may not enter the examination room until the invigilator gives permission.
8 No candidates are admitted into the examination room later than half an hour after the official start of the examination.
9 Candidates are not allowed to leave the examination room within the first half hour following the official start of the examination. After this time, permission to leave the room temporarily will be given only in urgent cases. No more than any one candidate may be absent at the same time.
10 Under no circumstances my items such as briefcases, bags and mobile telephones be used or handled in the examination room.
11 Although candidates are responsible for bringing their own calculators and their own writing and drawing materials, the faculty will provide answer sheets and scrap paper.
12 In the event that a certain examination requires students to use calculators, these calculators may at no time be able to exceed the maximum capabilities specified by the lecturer for that subject. In general, programmable calculating equipment is not allowed. (Generally examination assignments should be formulated such that they can be carried out with a simple calculator; at no times should candidates with more complex calculators have an advantage.)
13 Candidates may not write their answers in pencil, unless the lecturer has given prior permission for this.
14 During the interim examination, candidates may not consult books, readers, etc., unless the lecturer has given prior permission for this.
15 If an invigilator catches a candidate or candidates cheating, the procedure described in Article 6, paragraph 2 of these regulations will be applicable.
16 Before permanently leaving the examination room (i.e. no less than 30 minutes after the start of the interim examination), candidates must, at minimum, submit the front page of the answer sheet. This must bear their name and student number.
17 Before the interim examination begins, the invigilator shall instruct the candidates on the procedure they must follow if they leave the examination room without completing all the examination assignments.
18 Students who believe they may qualify for examination in a different form, should, as specified in Article 12 paragraphs 4 and 5 of the CER[1], submit a fully motivated request for this to the chair of the board of examiners.

[1] Course and Examination Regulations

Article 6 CHEATING

1 Cheating is defined as any act committed by a student for the purpose of making it partly or wholly impossible to make a correct assessment of his or her knowledge, insight and skills.
2 If a student is found to be cheating as defined in paragraph 1 of this Article, the board of examiners can decide to exclude him from the interim examination in question.
3 The decision to exclude a student as defined in paragraph 2 of this Article shall be taken on the basis of the invigilator's report of the cheating.
4 In urgent cases, the invigilator is entitled to act on behalf of the board of examiners by immediately excluding the student or students concerned. The board of examiners shall ensure that, immediately after the interim examination, the report defined in paragraph 3 of this Article is made in writing; and that a copy is issued to the student or students concerned.
5 Within 20 days of his or her exclusion, such a student may appeal to the board of examiners to reverse their decision. To this appeal, the student will attach a copy of the report defined in paragraph 4 of this Article; this may also be accompanied by the student's own written testimony.
6 Before deciding on an appeal of the sort defined in paragraph 5 of this Article, the board of examiners shall give both student and examiner the opportunity of a hearing.
7 The board of examiners will decide on any reversal of the original decision within 30 working days of receiving the student's appeal.
8 The consequence of exclusion is that no examination result will be recorded for the interim examination intended under paragraph 2 of this Article.
9 In the event of cheating, the board of examiners can decide, conditionally or unconditionally, to exclude the student from all further interim examinations for a maximum period of one year.

Article 7 CRITERIA

When taking the decisions that are integral to their duties, the board of examiners and, where appropriate, the examiner, shall be guided by the criteria stated below. When these criteria conflict, the board shall carefully weigh the interests of allowing one criterion to prevail over another. At all times, these standards must ensure that the following conditions are met:

a that the criteria regarding quality and selection inherent to an interim examination are maintained;
b that the need for efficiency is met, particularly by limiting to a minimum any time loss that would hinder those students whose preparations for examinations and interim examinations are running to schedule;
c that students who wish to assume too great a study load should be protected from themselves;
d that clemency should be shown in all cases in which students' progress is slowed by circumstances beyond their control.

Article 8 QUESTIONS AND ASSIGNMENTS

1 The scope of an interim examination, and the sources upon which it is based, shall be announced no less than a month before that examination takes place. No questions or assignments in the examination may go beyond the scope of these sources.
2 To the greatest possible extent, the questions and assignments of each interim examination shall be evenly distributed over the material being examined.
3 Both in content and form, each interim examination shall represent the learning objectives stated.
4 All questions and assignments shall be clear and explicit.
5 Well in advance of each interim examination, the board of examiners or the examiner shall announce the form of examination and method of testing as meant under Article 12 of the CER.
6 Well in advance of each written interim examination, the board of examiners or the examiner shall provide an opportunity whereby students intending to participate in it can examine a similar test on the same subject, together with sample answers and the norms that would be applied during its assessment.

Article 9 ASSESSMENT

1 The assessment of an interim examination is expressed in whole numbers on a scale from 1 to 10, with 6 signifying a pass. If desired, practical training can also be assessed as a "pass" or a "fail". All exemptions for a subject are treated as a 6, i.e. a pass.
2 Students pass their Master's examinations by satisfying the examiners in each component of the Master's programme. Students awarded a 5 in a single subject excepting the thesis project will also qualify for the award of their Master's degree.
3 Per subject, the highest mark awarded for an interim exam will be recorded on the examination certificate.

Article 10 THE ESTABLISHMENT OF EXAMINATION RESULTS[2]

1 The votes of the board of examiners shall be established by a simple majority of votes.
2 If the votes are equally divided, the chair of the board of examiners shall have the casting vote, unless the vote takes place in writing.
3 If, in a written vote, the votes are equally divided, there shall be a second ballot. If this, too, leads to an equal division of votes, the proposal being balloted shall be rejected.

[2] For the period within which students shall be notified of the results of interim examinations, see Article 14 of the Course and Examination Regulations (CER) for the Master's degree programmes.

Article 11 CUM LAUDE

1 At the discretion of the board of examiners, a candidate for the Master's degree can receive the designation "cum laude" if he or she meets the following conditions:
   a the mark awarded to the components specified in the Master's examination implementation procedures shall average no less than 8 in a list that contains no marks below 6;
   b the candidate concerned shall have completed the Master's degree programme in no more than two and a half years;
   c the mark awarded for the thesis project shall be no less than 8;
   d the examiner of the graduation assignment shall have submitted a proposal for the award of "cum laude".
2 When establishing the elapsed study time referred to in paragraph 1 subsection b of this Article, all due account should be taken of any delays caused by circumstances qualifying the candidate for support under the " Regeling Financiële Ondersteuning Studenten" (RFOS)
3 At all times, the board of examiners has the authority to decide on awarding the designation " cum laude" in cases that fall outside the provisions defined above.

Article 12 MASTER'S DEGREE CERTIFICATES AND STATEMENTS

1 To establish that a candidate has satisfied the examiners in the Master's examinations, the board of examiners shall issue a degree certificate. This shall be signed by the chair and the secretary to the board of examiners.
2 a The degree certificate as intended under paragraph 1 shall list the specific components of the examination, and, where appropriate, the competencies associated with them.
   b The degree certificate shall be accompanied by marks lists in both Dutch and English.
3 If a candidate's performance during the examinations testifies to exceptional abilities, the board of examiners can, under the conditions stated in Article 11 of these Regulations, decide to grant the designation " cum laude" on the degree certificate.
4 Any student who has successfully completed more than one interim examination and to whom, upon his or her leaving the university, a degree certificate as intended in paragraph 1 of this Article cannot be awarded, shall, upon his or her request, receive a statement from the board of examiners in question.

Article 13 PROCEDURE FOR APPROVALS

1 Any student wishing to submit a request as intended under Article 7.3 paragraph 4 of the WHW (i.e. with regard to a flexible study programme) should do so on a timely basis, ensuring that, by all reasonable definitions, there is time for approval to be given before he or she takes the first interim examination. In this, he or she should take full account of the period within which the board of examiners is entitled to decide (see Article 14, paragraph 1). The request shall be accompanied by a clearly argued motivation, and, if necessary, by material that supports it.
2 Students shall submit to the board of examiners any requests for exemption from an interim examination or practical exercise as intended under Article 17 of the CER. The board of examiners shall decide on this after taking advice from the student counsellor. The periods within which decisions shall be taken are defined in Article 14, paragraph 2 of these Regulations and Guidelines.

3 If a student wishes to depart from the teaching programme prescribed in the implementation procedures, he or she shall submit a request to this effect, ensuring that, by all reasonable definitions, there is time for approval to be given before the date of the first interim examination that deviates from that programme. In this, full account should be taken of the period within which the board of examiners is entitled to decide (see Article 13, paragraph 1).

4 A decision to withhold approval for a request of the type intended under paragraphs 1, 3 and 4 of this Article must be fully motivated by the Board of Examiners, and may only be made after the student has been given the opportunity of a hearing, where the student may call upon the assistance of the student counsellor.

5 The student will immediately be informed in writing of a decision on any of the matters intended under paragraphs 1, 2, 3 and 4 of this Article. If the board of examiners concerned has not made a decision during the time period prescribed in article 14, paragraph 1, or otherwise during the period of adjournment, approval will be understood to have been granted.

Article 14 TIME PERIODS

1 A decision on a request such as those described in Article 13, paragraph 1 or 4 shall be made within 40 working days of its receipt; or, if the request was submitted either during an academic holiday or within a period of three weeks before the start of an academic holiday, it shall be made within a period of 40 working days after the end of the holiday. The board of examiners may adjourn a decision for no more than 10 working days. The student will be notified in writing of any such adjournment before the end of the 40-day period specified in the first sentence of this paragraph.

2 The provisions of the previous paragraph will also be applicable to requests such as those described in Article 13 paragraph 3, on the understanding that the time period will start from the moment that the recommendations of the student counsellor have been submitted. The student counsellor shall submit these recommendations to the board of examiners no more than 10 working days after receiving the student's request.

Article 15 RIGHT OF APPEAL

Within four weeks of the event in question, students can appeal to the examinations appeals board against the following: a ruling by the board of examiners, a ruling by an examiner, or their treatment during an examination as defined in Article 7.60 WHW.

Article 16 MODIFICATION OF THESE REGULATIONS AND GUIDELINES

No decision shall be made in respect of the current academic year, unless, by all reasonable definitions, it is unlikely to damage the interests of students.

Article 17 DATE OF COMMENCEMENT

These regulations will come into effect on 1 September 2002.
Approved by the board of examiners of the Master's programme in Marine Technology on 10 June, 2002

6.5 Working conditions and RSI

RSI (Repetitive Strain Injury) is a well known problem by now. Within the TU Delft the number of complaints caused by RSI is increasing. Still too many employees and students neglect the first symptoms of RSI, without knowing where to go with their questions and complaints. On the internet there is a lot of information to be found on this matter. An example is http://www.rsi.pagina.nl. Free software, can be downloaded on the WbMT website, that helps you to prevent RSI: http://www.wbmt.tudelft.nl, button: "facilities".

Causes

There are two mechanisms that cause RSI:

- Dynamic loading: repetitive dynamic loading of muscles in fingers and hands, without taking breaks, can cause an overload in these muscles. Friction between muscles, tendons and bones can eventually cause damage.
- Static loading: constant stressing of muscles in the neck, shoulders and arms prevents blood circulation and squeezes off nerves. This results in cold and tingling fingers. Mental stress and unfavourable positioning of the body increases this effect.

Symptoms

There are various symptoms, which indicate RSI: pain, stiffnes, tingling and a loss of strength can occur in neck shoulders, arms, wrists, hands and sometimes even in legs. Wtihout resting these symptoms will only get worse.

Prevention

How to prevent RSI:

- Vary repetitive tasks, like typing and using a mouse, with non repetitive tasks, like walking to the printer or reading documents.
- Take regular breaks. It is recommended for every two hours work to take a 10-minute break and for every 10 minutes work to take a 20-second break, to improve blood circulation. It is even better to do exercises, within these breaks. For this purpose anti-RSI-software can help.
- It is strongly disrecommended to do more than six hours of computer work a day.
- Make sure that the working position of the body is correct. A good installed workplace is important for a correct working position. Sit straight in front of your monitor and keyboard. The height and distance of the monitor and desk should be sufficient. A chair with a convex back at waist height is favourable.
- Try not to work under stress caused by deadlines or private problems.

Don't neglect the symptoms of RSI. For questions you can contact the following people:

- Student adviser (paragraph 3.6)
- Student Health Care (SGZ), tel: 015 2121507, studentenartsen@sgz.nl
- Student Advisory Bureau (STA*D), tel: 015 27 88012
- VSSD support, tel: 015 27 82057, steunpunt@oli.tudelft.nl

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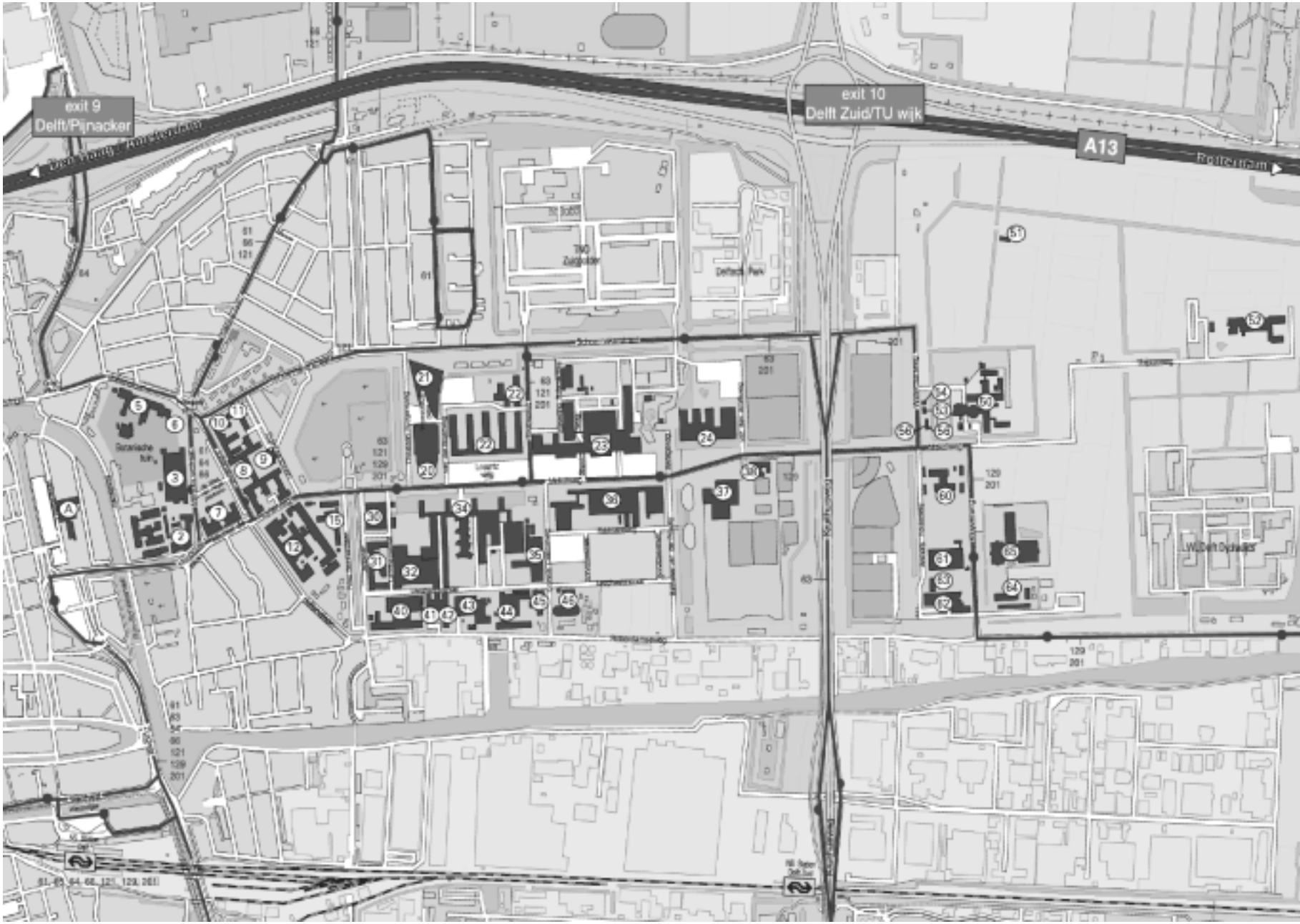
Vlasblom, prof. ir. W.J.	83973	W.J.Vlasblom@WbMT.TUDelft.nl	3B-0-450	WbMT
Van de Voorde, prof. dr. E	84682	E.vandeVoorden@WbMT.TUDelft.nl	7-1-122	WbMT
Vries, ir. E.J.H. de	86980	E.J.H.deVries@WbMT.TUDelft.nl	8C-3-18	WbMT
Weiden, dr. ir. A.J.J.	85609	A.J.J.vanderWeiden@wbmt.tudelft.nl	8C-0-04	WbMT
Werff, prof. dr. ir. K. van der	85729	K.vanderWerff@WbMT.TUDelft.nl	8D-4-17	WbMT
Westerweel, prof. dr. ir. J.	86887	J.Westerweel@WbMT.TUDelft.nl	5B-1-13	WbMT
Wieringa, prof. dr. ir. P.A.	85763	P.A.Wieringa@WbMT.TUDelft.nl	8C-1-13	WbMT
Wijting, mr. W.	84710	W.Wijting@TBM.TUDelft.nl	3.3.060	TBM
Wisse, ir. G.	82702	G.Wisse@WbMT.TUDelft.nl	8C-2-12	WbMT
Woerkom, dr. ir. P.Th.L.M. van	82792	P.vanWoerkom@WbMT.TUDelft.nl	8C-2-18	WbMT
Wolffenbuttel, dr. ir. R.F.	86287	R.F.Wolffenbuttel@ITS.TUDelft.nl	HB 13.030	ITS-et
Woudstra, ir. N.	82178	N.Woudstra@WbMT.TUDelft.nl	8D-2-12	WbMT

For other phone numbers the student can call the universal TU number (015 27 89111) or the reception of the faculty (015 27 86666)

1 Phone numbers in full are 015-27…..

2 API: Leeghwaterstraat 44, 2628 CA Delft
CTG: Stevinweg 1, 2628 CN, Delft
IO: Landberghstraat 15, 2628 CE Delft
ITS-et: Mekelweg 4, 2628CD Delft
LR: Kluyverweg 1, 2629 HS Delft
TBM: Jaffalaan 5, 2628 BX Delft
TNW: Lorentzweg 1, 2628 CJ Delft
WbMT: Mekelweg 2, 2628CD Delft


exit 9
Delft/Pijnacker
exit 10
Delft Zuid/TU wijk
A13