

Marine Technology
MSc Programme

Study guide
2006/2007

www.masteryourfuture.nl



 **TU Delft**

Delft University of Technology

Disclaimer

This guide has been compiled with the utmost care by the Faculty. There are a number of items about which further information will only become available after this guide has been published. For this reason the information published in this guide can be subject to change. Changes, additional information and more detailed course descriptions are available on Blackboard: blackboard.tudelft.nl and/or on the SIS website www.tudelft.nl/sis.

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Personal details

name _____

address _____

postal code / city _____

telephone _____

mobile _____

e-mail _____

NOTIFY IN CASE OF EMERGENCY:

name _____

address _____

postal code / city _____

country _____

telephone _____ mobile _____

MEDICAL INFORMATION:

medications _____

allergies _____

passport no _____

blood group _____

organ donor: yes / no; card no: _____

If found, please return this student guide or contact the owner.

Faculty Preface

The *MT Compass* concerns the Master's programme in Marine Technology. It gives all the information students need to plan their study effectively. This year, the detailed course schedules are given only on the website "campus.3mE.TUdelft".

The programme is offered in two specialisations:

- Design, Production and Operation;
- Science.

The different focus areas within these specialisations offer students a wide choice, all covering extremely interesting applications and fundamental aspects of Marine Technology.

For the first time it will be possible for students of the Design Production and Operation (DPO) specialisation to follow a number of courses at the Norwegian University of Science and Technology in Trondheim. They can spend the first semester in Trondheim, studying alongside Norwegian Marine Technology students. In the second semester, both Norwegian and Dutch students will follow courses in Delft. It is envisaged all DPO students half of the 2007-2008 academic year in Trondheim.

The editors of this guide wish all students a prosperous academic year.

Prof. Peter A. Wieringa.

Director of Education, Faculty of 3mE.

Academic calendar 2006/2007

Fall semester

4/9/06		15.00 Aula: opening academic year
4/09	- 20/10	scheduled teaching activities
23/10	- 3/11	no scheduled activities/ examinations/ scheduled teaching activities
6/11	- 22/12	scheduled teaching activities
27/12	- 5/1/07	Christmas vacation
8/1/07	- 12/1	no scheduled activities
15/1	- 2/2	examinations

Spring semester

5/2/07	- 23/3	scheduled teaching activities
26/3	- 5/4 (do)	no scheduled activities/ examinations/ scheduled teaching activities
10/4 (Tue)	- 27/4	scheduled teaching activities
6/4		Good Friday
9/4		Easter Monday
30/4	- 4/5	no scheduled activities (May vacation)
7/5	- 8/6	scheduled teaching activities
17/5, 18/5		Ascension day
26/5		no scheduled activities
28/5		Whit Sunday
11/6	- 15/6	no scheduled activities
18/6	- 6/7	examinations
20/8	- 31/8	examinations/repeats

Note: examinations are usually called 'tentamens' in Dutch. Formally an 'examen' in Dutch is the degree audit taking place at the end of a programme phase such as a Propaedeuse (end of first year), a Bachelor or a Master phase. These 'examens' are formalities in the Dutch university system. There are no end-of-year examinations!

Class hours for Delft University of Technology

Period Time

1.	08.45	–	09.30
2.	09.45	–	10.30
3.	10.45	–	11.30
4.	11.45	–	12.30
5.	13.45	–	14.30
6.	14.45	–	15.30
7.	15.45	–	16.30
8.	16.45	–	17.30



TU Delft – University Facts and Mission

Founded in 1862, Delft University of Technology is the oldest, largest, and most comprehensive university of technology in the Netherlands. With over 13.000 students and 2100 scientists (including 200 professors), it is an establishment of both national importance and significant international standing. Renowned for its high standard of education and research, the University collaborates with other educational establishments and research institutes, both in the Netherlands and overseas. It also enjoys partnerships with governments, branch organisations, numerous consultancies, the industry, and companies from the small and medium business sectors. Delft University of Technology has eight faculties offering a host of engineering programmes, many of them unique in the Netherlands.

Working together with other educational establishments, various research institutes, international business partners and the industry, TU Delft aims to provide students with all the necessary tools for a successful career: an excellent education, relevant, practical experience, and the broadest possible knowledge base. Detailed information can be obtained from the website www.tudelft.nl

International Office

This office will be your first point of contact at the University. The International Office staff handles the application procedure, financial and housing matters, and the distribution of student ID cards. The International Office comprises the central TU Delft Student Registration Office, which registers you as a student when you are admitted to TU Delft.

The Student Facility Centre publishes a Guide to Services, which is available from Julianalaan 134 or can be obtained by phoning +31 (0)15 27 88012 or emailing sfc@tudelft.nl

TU Delft International Office
PO Box 5
2600 AA Delft

The Netherlands
Tel: +31 (0) 15 27 88012
Fax: +31 (0) 15 27 85690
E-mail: admission@tudelft.nl
Website: www.studyat.tudelft.nl

Visiting address:
Julianalaan 134
2628 BL Delft
The Netherlands

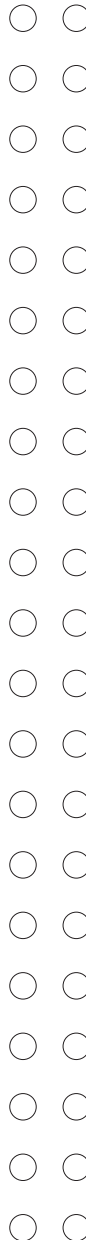
Around October 2006 the International Office and the Student Facility Centre will move to a new location at the Mekelweg.
Postal address:
Jaffalaan 9A
2628 BX Delft
Visitors' entrance at the Mekelweg

Service desk

The Service Desk provides you with your transcripts, timetables and exam dates, and it posts the exam results. Here you submit forms, you inform them of recently acquired marks, and a change of address. The Service Desk tracks student progress, i.e. the number of credits and marks you obtain and any group work done in a semester and/or academic year. More information is available on servicepunt.tudelft.nl
The Service Desk is open Monday to Friday, from 8.00 a.m. to 5.00 p.m.

Blackboard

Blackboard provides you with the most recent information about your courses. It is a commercial E-learning medium that serves as a virtual notice board for announcements, timetables, presentation of programme materials, practice materials, exercises and solutions as well as interesting links. You can enter the system using the 'Preview' button in the login



screen, but to access all information, you need a personal login ID.
Website: blackboard.tudelft.nl
Request assistance through Blackboard-support@tudelft.nl

Schedules

For up-to-date schedules, go to blackboard.tudelft.nl or the campus website of your faculty.

TU Delft Library

The TU Delft Library consists of a central branch located behind the Aula and seven faculty branches in a number of locations. The collection, the excellent study facilities, the modern PCs and the package of services in each library are designed to provide you with optimal access to relevant science and technology literature. On the Library's website, www.library.tudelft.nl, you can find all information you need if you want to visit a library or use one of the services of the TU Delft Library.

Customer Services TU Delft Library:
Tel: +31 (0)15 27 85678
Fax: +31 (0)15 27 85706
E-mail: library@tudelft.nl
Website: www.library.tudelft.nl

Opening times central branch:

	Tuition period	Examination period	Summer holiday
Monday - Thursday	9.00 - 22.00	9.00 - 24.00	9.00 - 17.00
Friday	9.00 - 18.00	9.00 - 22.00	9.00 - 17.00
Saturday - Sunday	10.00 - 18.00	10.00 - 22.00	closed

The opening times of the faculty libraries can be found at www.library.tudelft.nl under 'locations'.

Opening times central information desk:

Monday - Thursday	9.00 - 19.00
Friday	9.00 - 17.00
Saturday	10.00 - 13.00
Sunday	closed

Every first Monday of the month: 11.00 - 19.00

Regulations

There are a number of formal regulations for the faculty organization, the programmes and their execution. These are:

- The Faculty Regulations
- The Course and Examination Regulations ('Onderwijs- en Examen-reglement').
- (Per programme) The Execution Regulations of the Education and Examination Regulations ('Uitvoeringsregeling').
- The Rules and Guidelines of the Board of Examiners ('Regels en Richtlijnen van de Examen Commissie').
- The Student Charter ('Studentenstatuut')

These regulations are published yearly on the web, see the Blackboard community of the programme involved. In case of doubt, your Director of Education or your Study Adviser will be glad to inform and advise you.

EUROPEAN STUDENT UNION (AEGEE)

AEGEE is the European students' association, represented in 271 cities in 40 countries. Over 17,000 member students are actively involved in travelling, participating in fun and pleasure events and conferences on topics that concern you. There are a lot of possibilities to travel to other places in Europe, meet new people and make friends everywhere! In every city there is an independent local association such as AEGEE-Delft.

Check out the website: www.aegee-delft.nl



TU DELFT'S STUDENT UNION (VSSD)

The purpose of the VSSD is to safeguard the interests of all students studying at Delft University of Technology. The Union mainly focuses on areas such as education, income, legal status and housing. The VSSD is a member of the National Student Union (LSVB) and of the ISO (a national student body). As well as representing the collective interest of students, the VSSD also provides support and services to individual students by helping them with financial, housing, study and other problems, and through the publication and sale of reasonably priced textbooks.

Office:

Leeghwaterstraat 42 (building 45 on map)

Tel: +31 (0)15 27 82050

Fax: +31 (0)15 27 87585

E-mail: balie@vssd.nl

Website: www.vssd.nl

Opening hours: Monday to Thursday 08.30-17.00, Friday 08.30-13.00

Shop:

Leeghwaterstraat 42,

Tel: +31 (0)15 27 84125

Fax: +31 (0)15 27 81421

E-mail: winkel@vssd.nl

Opening hours: Monday to Friday between 10.30-14.00 and 15.00-17.00

USEFUL WEB ADDRESSES:

www.tudelft.nl (general information about Delft University, history, programmes, research, etc.)

www.studyat.tudelft.nl (information about all BSc and MSc programmes offered by Delft University of Technology, information about the requirements, how to apply, costs, funding, insurance, housing, medical and pastoral care, facilities for special needs students etc.)

www.ideeenlijnOS.tudelft.nl (You can post your suggestions and comments with a view to improving the services provided by O&S on this website. You can also use this address for complaints, of course.)

www.snc.tudelft.nl (TU Delft Sports & Cultural Centre)

www.dsdefl.nl/centrum (information about Delft)

www.denhaag.org (for activities in the nearby city of Den Haag)

www.uitaandemaas.nl (activities in Rotterdam)

www.amsterdam.nl (activities, news, public transport in and around Amsterdam)

ADDRESSES:

Delft University of Technology (TU Delft)

Visiting address:

Julianalaan 134
2628 BL Delft
The Netherlands

Postal address:

PO Box 5
2600 AA Delft
The Netherlands



Tel: +31 (0)15 27 89111

Fax: +31 (0)15 27 86522

E-mail (for questions): voorlichting@tudelft.nl

(For information about the city of Delft, please see www.delft.nl)

Education and Student Affairs

Tel: +31 (0)15 27 84670

E-mail: OS@tudelft.nl

Website: www.OS.tudelft.nl

- Central Student Administration (CSA)

PO Box 5

2600 AA Delft

Tel: +31 (0)15 27 84249

E-mail: msc2@tudelft.nl

Website: www.csa.tudelft.nl/

Office hours: 8.30-17.00

- International Office

Julianalaan 134

2628 BL Delft

Tel: +31 (0)15 27 88012

E-mail: msc2@tudelft.nl

Website: www.studyat.tudelft.nl

- Student Facility Centre (SFC)

Study Advisers:

Opening hours: Monday to Friday 09.00-17.00.

Student Psychologists:

Tuesday and Thursday 11.30-12.30

Julianalaan 134

2628 BL Delft

Tel: +31 (0)15 27 88012

E-mail: sfc@tudelft.nl

Around October 2006, Education and Student Affairs (i.e. CSA, International Office, Student Facility Centre) will move to a new location on the Mekelweg.

Postal address:

Jaffalaan 9A

2628 BX Delft

Visitors' entrance at the Mekelweg

Sports & Cultural Centre

Mekelweg 8-10

2628 CD Delft

Tel: +31 (0)15 27 82443

E-mail: sportcentrum@tudelft.nl

Website: www.snc.tudelft.nl

Monday to Friday: 08.30-23.30; Saturday and Sunday: 08.30-19.00.

Student Health Care: SGZ

Surinamestraat 4

2612 EA Delft

To make an appointment, call +31 (0)15 212 1507

Monday to Friday 8.30-12.15

Stichting DUWO

(Delft Housing Agency)

Marlotlaan 5

2614 GV Delft

Tel: +31 (0)15 219 2200

E-mail: info@duwo.nl

Website: www.duwo.nl

Office hours: Monday to Friday 08.30-17.00.

Student Restaurants in Delft

- University main cafeteria, Aula, Mekelweg 5

- SnC Café, Mekelweg 8

- Sint Jansbrug, Oude Delft 50-52



- Koornbeurs, Voldersgracht 1
- Alcuin, Oude Delft 123
- CSR, Oude Delft 9
- De Bolk, Buitenwatersloot 1-3
- Novum, Verwersdijk 102-104

Map of TU Delft



● — Buildings and fields



A	Ezelsveldlaan 61	Delft Technology Museum	<input type="radio"/>	<input type="radio"/>
2	Mijnbouwplein 11	Used by various external parties	<input type="radio"/>	<input type="radio"/>
3	Mijnbouwstraat 120	Applied Earth Sciences	<input type="radio"/>	<input type="radio"/>
5	Julianalaan 67	Biotechnology (Kluyver Lab)	<input type="radio"/>	<input type="radio"/>
6	Poortlandplein 6	Botanic Gardens	<input type="radio"/>	<input type="radio"/>
8	Julianalaan 132-134	TU Delft Student Facility Centre	<input type="radio"/>	<input type="radio"/>
9	Zuidplantsoen 2	MultiMedia Services (MMS)	<input type="radio"/>	<input type="radio"/>
10	Zuidplantsoen 6	Student Council	<input type="radio"/>	<input type="radio"/>
11	Zuidplantsoen 8	Real Estate and Facility Management	<input type="radio"/>	<input type="radio"/>
12	Julianalaan 136	Delft ChemTech	<input type="radio"/>	<input type="radio"/>
15	Prins Bernhardlaan 6	Kramers Laboratorium voor Fysische Technologie	<input type="radio"/>	<input type="radio"/>
17	i-WEB:	Vehicle for Research, Education and Design	<input type="radio"/>	<input type="radio"/>
19	Mekelweg 3	Stud: student employment agency	<input type="radio"/>	<input type="radio"/>
20	Mekelweg 5	Aula Congress Centre	<input type="radio"/>	<input type="radio"/>
21	Prometheusplein 1	TU Delft Central Library	<input type="radio"/>	<input type="radio"/>
22	Lorentzweg 1	Faculty of Applied Sciences	<input type="radio"/>	<input type="radio"/>
23	Stevinweg 1	Faculty of Civil Engineering and Geosciences	<input type="radio"/>	<input type="radio"/>
24	Berlageweg 1	Faculty of Architecture, Urbanism and Building Sciences	<input type="radio"/>	<input type="radio"/>
30	Jaffalaan 9	OTB Research Institute	<input type="radio"/>	<input type="radio"/>
31	Jaffalaan 5	Faculty of Technology, Policy and Management	<input type="radio"/>	<input type="radio"/>
32	Landbergstraat 15	Faculty of Industrial Design Engineering	<input type="radio"/>	<input type="radio"/>
33	Landbergstraat 19	Composites Laboratory INHOLLAND/TU Delft	<input type="radio"/>	<input type="radio"/>
34	Mekelweg 2	Faculty of Mechanical, Maritime and Materials Engineering	<input type="radio"/>	<input type="radio"/>
34a	Cornelis Drebbelweg 9	Executive Board	<input type="radio"/>	<input type="radio"/>
35	Cornelis Drebbelweg 5	Examination rooms	<input type="radio"/>	<input type="radio"/>
36	Mekelweg 4 + 6	Faculty of Electrical Engineering, Mathematics and Computer Science	<input type="radio"/>	<input type="radio"/>
37	Mekelweg 8	TU Delft Sports Centre	<input type="radio"/>	<input type="radio"/>
38	Mekelweg 10	TU Delft Cultural Centre	<input type="radio"/>	<input type="radio"/>
40	Rotterdamseweg 137	Materials Engineering	<input type="radio"/>	<input type="radio"/>
43	Leeghwaterstraat 36	Cogeneration plant	<input type="radio"/>	<input type="radio"/>
44	Rotterdamseweg 145	Yes!Delft/Technostarters	<input type="radio"/>	<input type="radio"/>

45	Leeghwaterstraat 42	VSSD & Low Speed Wind Laboratory	<input type="radio"/>	<input type="radio"/>
46	Leeghwaterstraat 44	Process and Energy Laboratory (API)	<input type="radio"/>	<input type="radio"/>
50	Mekelweg 15	Radiation Radionuclides & Reactors (R3) / Reactor Institute Delft (RID)	<input type="radio"/>	<input type="radio"/>
61	Kluyverweg 3	Faculty of Aerospace Engineering: Vliegtuighal	<input type="radio"/>	<input type="radio"/>
62	Kluyverweg 1	Faculty of Aerospace Engineering	<input type="radio"/>	<input type="radio"/>
63	Anthony Fokkerweg 1	Faculty of Aerospace Engineering: SIMONA	<input type="radio"/>	<input type="radio"/>
64	Kluyverweg 2	High Speed Wind Laboratory	<input type="radio"/>	<input type="radio"/>
65	Kluyverweg 4 + 6	Delft Transport Centre (DTC)	<input type="radio"/>	<input type="radio"/>

1.1 OBJECTIVE

The objective of the Master's programme Marine Technology is to educate graduates in Marine Technology to undertake careers as scientists or engineers at an advanced professional level. The level corresponds to the scientific and technological borders of a specific discipline. The graduates are capable of:

- identifying, defining and analysing problems, to the solution of which Materials Science and Engineering principles and techniques can contribute
- developing and producing a sound solution to the problem
- presenting these solutions effectively

The Master's graduate of Materials Science and Engineering meets, to a sufficient level, the following qualifications:

1. Broad and profound knowledge of engineering sciences (mathematics, physics and chemistry) and the capability of applying this knowledge in the Materials Science and Engineering discipline at an advanced level.
2. Broad and profound scientific and technical knowledge of the Materials Science and Engineering discipline and the skills to use this knowledge effectively. The discipline is mastered at different levels of abstraction, including a reflective understanding of its structure and relations to other fields, and reaching the forefront of scientific or industrial research and development on numerous occasions. The knowledge is the basis for innovative contributions to the discipline in the form of new knowledge about materials or development of new materials.
3. Thorough knowledge of paradigms, methods and tools as well as the skills to actively apply this knowledge to analysing, modelling, simulating, designing and performing research with respect to problems related to Materials Science and Engineering.
4. Capability of independently solving technological problems in a systematic way involving problem analysis, formulating sub-problems and providing innovative technical solutions, also in new and unfamiliar situations. This includes a professional attitude towards identifying and acquiring any expertise lacking, monitoring and critically evaluating existing knowledge, planning and executing research, adapting to changing circumstances, and integrating new knowledge with appreciation of its

ambiguity, incompleteness and limitations.

5. Capability of working both independently and in multidisciplinary teams, interacting effectively with specialists and taking initiatives where necessary.
6. Capability of effectively communicating (including presenting and reporting as well as contributing significantly to a scientific paper) about one's work such as solutions to problems, conclusions, knowledge and considerations, to both professionals and a non-specialised public in the English language.
7. Capability of evaluating and assessing the technological, ethical and societal impact of one's work, and to take responsibility with regard to sustainability, economy and social welfare.
8. Attitude to independently maintain professional competence through life-long learning.

1.2 EDUCATIONAL CONCEPT AND ASSESSMENT

The Master's programme Marine Technology covers two years of study, each with a study load of 60 EC (European credits). The total programme involves 120 EC and comprises cursory modules, assignments and a Master's thesis project:

Cursory modules (50 - 70 EC)

These are offered as lectures given simultaneously to all students taking the module. Most cursory modules are assessed by means of a written examination. In some cases however assessment takes place by means of an oral examination.

- Compulsory courses specialisation (at least 20 EC)
- Compulsory courses focus area
- Elective courses (at least 15 EC)

These courses should include at least 6 EC worth of social courses and 9 EC of fundamental engineering courses.

Assignments (50-70 EC)

This form is used for projects, practicals and a possible internship in industry or a research institute. Assignments are offered to individual students or small groups of students and are assessed by a report and / or a presentation.

The requirements for assignments and lecture courses are specified in section 1.5 for each focus area. Assignments may involve:

- An internship in industry or a project defined in consultation with an external party (industry, research institute, etc.) of 15 EC. This may be combined with the MSc thesis if performed in cooperation with and at the location of an external party.
- MSc thesis (30 - 60 EC)
- Other individual or group assignments.

MSc Thesis Project

Each individual student prepares a thesis as a report of his/her research project. The thesis work is evaluated through an oral presentation by the candidate and an oral examination before an MSc examination committee. This committee is composed of at least three scientific staff members, including the thesis supervisor. The examination committee may also include external examiners from research institutes or from industrial partners.

1.3 STUDY PROGRAMME AND GENERAL STRUCTURE

Marine Technology offers an MSc course of two years. Each course year is divided into two semesters and each semester consists of two periods. In this study guide these will be referred to as 1A, 1B, 1C and 1D. A period includes seven weeks of lectures, followed by two or three examination weeks. For those subjects for which written examinations are held, the student will get at least one opportunity per year to do a resit. Resits are generally held in the first period after the regular period for a certain examination. Resits for the examinations held in period 2B are scheduled for the second half of August.

The study load of a course is expressed in European Credits. This is a result of the European Credit Transfer System (ECTS), which encourages acknowledgement of study results between higher education institutions within the European Union. The study load for one educational year is 60 EC. These ECs give an indication of the weight of a certain part of the course. One EC involves approximately 28 hours of study. These 28 hours include all time spent on the course: lectures, self-education, internship, practicals, examinations, etc.

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 (1.4.1). However the Master's programme can also be entered after completing a Bachelor's programme of a Dutch polytechnic institute or the "Royal Netherlands Naval College" (KIM, 1.4.2).

1.4.1 ACADEMIC BACHELOR'S DEGREE

BSc Marine Technology

Students with a BSc in Marine Technology from Delft University of Technology (TU Delft) can enter the MSc programme without selection.

A student may be admitted conditionally to the Master's programme, to take part in the interim examinations of certain MSc courses, subject to Board of Examiners approval.

The prerequisites for conditional admission are that the student has passed the first year of the BSc and has already obtained at least 100 EC in the second and third-year programme. Final admission is granted after completing the BSc.

TU Delft BSc degree in Mechanical Engineering (ME), Civil Engineering (CI), Aerospace Engineering (AE), Industrial Design Engineering (ID), Applied Physics (AP) and Chemical Engineering (CE)

Students with one of these degrees 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 worth 45 EC in total or less. 15 EC of these additional courses will be part of the elective courses and at most 30 EC will be part of an additional programme. The total programme will amount to: $120 + \max 30 = 150$ EC at most. These additional requirements will ensure that the student has at least an entrance level comparable to the second year of the Marine Technology BSc programme. The lecturer of the focus area can also require that in addition the student takes a number of third year courses of the BSc programme.

Courses are given in Dutch. A summary of additional courses and requirements is given below, in Dutch.

The additional courses are the following:

Course code	Title	EC	AP	AE	CI	ID	ME	CE
mt219	Maritieme werktuigkunde 1	4	x	x	x	x	x	x
mt526	Hydromechanica 2	3	x	x	x	x	x	x
mt527	Hydromechanica 3	2	x	x	x	x	x	x
mt837	Construeren en sterkte 2	3	x					x
mtp208	Ontwerpen 1	7	x	x	x	x	x	x
	Hydromechanica 4 (in 2007-2008)	4	x	x	x	x	x	x
	Scheepsproductie 2 (in 2007-2008)	3	x	x	x	x	x	x
wb1114	Statica	3	x					x
wb1115	Sterkteleer 1	4	x					x
wb1116	Dynamica A	4						x
wb1217	Sterkteleer 2	3	x			x		x
wb1218	Niet lineaire mechanica	2	x			x		x
wb1216	Dynamica 2	3	x		x	x		x
wb1225	Stromingsleer	3				x		
wb2105mt	Regeltechniek voor MT	3			x			
wb4100	Thermodynamica 1	3			x	x		
wb6100	Materiaalkunde 1	3	x					
wi1313mt	Lineaire algebra 1	3				x		
wi1314mt	Lineaire algebra 2	3				x		
Total number of ECs			44	23	32	43	23	45

Up to 15 EC may be accounted for by the free elective courses for the MSc Marine Technology. Any other credits obtained will not count towards the 120 EC required by the Master's programme.

Other TU Delft BSc degree

The contents of the BSc degree and marks of each candidate will be evaluated by the intake coordinator of the board of examiners.

The selection procedure can result in:

- Admission without additional requirements.
- Admission with additional requirements of less than 15 EC. In this case the total study programme will involve 120 EC.
- Admission with additional requirements between 15 and 45 EC. In this case 15 EC are part of the 120 EC of the regular MSc programme and at most an additional 30 ECs is required besides the regular MSc programme. The total study programme will involve 120 + max 30 = at most 150 EC.
- 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.

With approval of the Board of Examiners the student can be conditionally admitted to the MSc programme, to take part in interim examinations of a few MSc courses. Requirements for conditional admission are: the student has passed the propaedeutic examination and has obtained at least 100 ECs of the second and third year, including the BSc thesis. Final admittance is granted after completion of the BSc programme.

1.4.2 BACHELOR'S DEGREE IN MARINE TECHNOLOGY OF DUTCH INSTITUTE OF PROFESSIONAL EDUCATION (HBO) OR THE 'HOGERE ZEEVAARTSCHOOL' (HZS)

A candidate can be admitted if he or she has completed the HBO or HZS Bachelor's programme within 4 years with good results. A number of additional courses from the second year of the Marine Technology BSc programme have to be taken. Candidates are admitted to the pre-Master's programme, which means that they can follow both the pre-Master's and MSc courses. Final admission to the MSc programme is given after completion of the pre-Master's programme.

- HBO and HZS students may attend courses and examinations of the chosen specialisation while following the additional programme.
- HBO and HZS students have an exemption for the internship (15 EC) depending on their prior programme.
- HBO students are exempted from the 6 EC society-oriented courses.
- In consultation with the coordinator of the focus area, a number of courses will be included in the programme to comply with the BSc and MSc level of the focus area.
- The entire study programme for HBO student amounts to $34 + 120 - 15 = 139$ EC.
- The entire study programme for HZS student amounts to $51 + 120 - 21 = 150$ EC.

From September 2006 it is possible for Marine Engineering students of the Hogeschool Haarlem and the Hogeschool Rotterdam to follow a minor programme, which after completion of the BEng study gives unconditional admission to the Marine Engineering MSc programme. This minor involves a significant part of the pre-Master's programme (see table below), which can be followed during the third and fourth years of the HBO programme. To this end these students attend lectures, examinations and a project at Delft University two days a week. The missing part of the pre-Master's programme will be included in the MSc programme instead of the internship. The total study load of the MSc programme is the regular 120 EC in this case.

COURSE CODE	COURSE NAME	TH/HZS EC	TH-minor EC
Mathematics			
wi1152th	Analyse 1 th	3	3 (1 ^e kw,jr3)
wi1153th	Analyse 2 th	3	-
wi1154th	Analyse 3 th	3	3 (3 ^e kw,jr3)
wi2256th1	Lineaire Algebra th	3	3 (2 ^e kw,jr3)
wi2256th2	Differentiaal Vergelijkingen th	3	3 (3 ^e kw,jr3)
Mechanics			

wb1217	Sterkteleer 2	3	3 (2 ^e kw,jr3)
wb1216	Dynamica 2	3	3 (4 ^e kw,jr3)
wb1218	Niet Lineaire Mechanica	2	-
Fundamental Wb/MT			
wb1225	Stromingsleer	3	-
mt527	Hydromechanica 3	2	-
mt837	Construeren en sterkte 2	3	-
wb2105mt	Regeltechniek voor MT	3	3 (4 ^e kw,jr3)
Extra in minor			
mtp206	Productie project	-	4 (1 ^e kw,jr4)
mtp207	Constructie project	-	5 (2 ^e kw,jr4)
Total pre-Master's programme		34	
Total minor programme			31
Still to do in MSc programme			13

Additional courses HZS students

COURSE CODE	COURSE NAME	HZS/EC
mt219	Maritieme werktuigkunde A	2
mt526	Hydromechanica 2	3
mt527	Hydromechanica 3	2
mt837	Construeren en sterkte 2	3
mtp208	Project Ontwerpen 1	7

TH/HZS admission coordinator is ir. Jaap van der Zanden.
Secretary of the Board of Examiners is Ewoud van Luik.

1.5 MSC PROGRAMME MARINE TECHNOLOGY

Before entering the MSc programme, the student should compile a list of courses and submit it to the lecturer in the chosen focus area for approval. The relevant form is obtainable from the Faculty of 3mE Service Desk located behind the porter's lodge. The programme's general requirements are described in section 1.2.

Specialisations and focus areas in 2006-2007

There are 2 different specialisations in Mechanical Engineering, with a total of 7 focus areas.

1 Science (SC)

- 1.1 Ship Hydromechanics (SH)
- 1.2 Ship and Offshore Construction (SOC)

2 Design, Production and Operation (DPO)

- 2.1 Marine Engineering (ME)
- 2.2 Ship Production (SP)
- 2.3 Ship Design (SD)
- 2.4 Shipping Management (SM)
- 2.5 Offshore Units Design (OD)

Annotations

There are also 2 annotations which can be done as a supplement to the focus area programme:

- a Technical Marketing
- b Sustainable Development

1.5.1 SCIENCE SPECIALISATION

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The development of new concepts for ships and other floating structures and the application of new construction materials require in-depth knowledge of and skills in applying 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 is key in this respect. The Science specialisation is aimed at further development of such knowledge and skills, assuming that the

basics have been mastered in the Bachelor's phase of the programme.

The bulk of the Science specialisation is taken up with the study of mathematics, advanced hydrodynamics, properties of new materials, advanced methods of structural analysis and advanced ship concepts.

Within this specialisation the student may choose between the following focus areas.

- Ship Hydromechanics (SH).
- Ship and Offshore Construction (SOC).

If you wish, your final-year Master's project may cover both areas.

In the science specialisation, 20 EC during the first year are devoted to compulsory subjects which include selected topics from both the hydrodynamic and structural disciplines, as shown in the table below.

Compulsory courses: Science specialisation

Course code	Course name	Contact hours	EC
mt514	Ship Motions and Manoeuvring 3	0/0/0/4	3
mt523	Numerical Methods for MT	0/4/0/0	4
mt835	Hydro Structural Subjects	0/0/4/0	3
mt836	Advanced Programming	0/0/2/2	3
wb2310	System and Control Engineering 3	0/4/0/0	4
wm0732mt	Maritime Law	4/0/0/0	3
Total			20

Another 30-45 EC is devoted to specific subjects selected in consultation with the head of the hydrodynamics or structural programme. Some of these EC may be obtained by taking a traineeship in industry. That may also be taken in the final year, after consultation with the head of department.

The final-year Master's project may be carried out in-house or in co-operation with industry or research institutes, depending on the student's preference and subject to the availability of positions in industry.

1.5.1.1. SHIP HYDROMECHANICS FOCUS AREA

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Hydromechanics – that is, hydrostatics and hydrodynamics – is playing an increasingly important role in the design and operation of ships and other floating structures. And its importance is increasing as more numerical methods to predict the behaviour of a vessel and its propulsor become available for use in evaluating a particular design or operation at an early stage of development. As a final check on the performance of a ship, model tests are often performed because computational methods – while enormously increasing insight into the effect of design parameters on performance – do not always provide sufficiently accurate results for, say, contract purposes.

For the practicing hydrodynamicist, an insight into the background of hydromechanical theory and the corresponding numerical methods used to generate practical data is indispensable. To understand applied hydromechanics, knowledge of and insight into the fundamental physics of ship-water and propulsor-water interaction, as well as the underlying mathematical theories of hydromechanics, are also necessary.

The Ship Hydromechanics focus area aims to provide such knowledge and insights, assuming that students have obtained basic knowledge of ships and other floating structures and of the processes involved in their design,



production and operation during the Bachelor's phase.

On completion of the Master's focus area Hydromechanics, the student can look forward to applying his or her knowledge and skills in the marine industry or in research institutes active in that field.

The MSc programme is made up of the following components.

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 with industry or at a research institute (6-10 weeks)
- Master's project, either in Applied Hydromechanics in co-operation with industry or a research project carried out in-house or at a research institute.

Examples of recent MSc projects

- A theoretical and experimental investigation into the hydrodynamics of slamming of the bowflare of ships.
- Dynamic motions analysis of a moored Kingsize Heavy Lift Vessel in waves.
- Analysis and optimisation of DICAS: a closer look at the Differentiated Compliance Anchoring System.
- Wave-feedforward 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 of water motions in a moonpool.
- Surfing of sailing vessels in following seas.
- Realistic inflow conditions for numerical simulation of greenwater loading.

Compulsory courses: Ship Hydromechanics focus area

Course code	Course name	Contact hours	EC
mt515	Resistance and Propulsion 3	2/2/0/0	3
mt524	Hydromechanics of Special Ship Types	0/0/4/0	3

Recommended elective courses: Ship Hydromechanics focus area

Course code	Course name	Contact hours	EC
ae2-115	Aërodynamica B		3
ae3-130	Aërodynamica D		3
ae4-151	Num. Meth. in de vliegtuig-aërodynamica		3
ct4130	Probabilistisch ontwerpen		4
mt218	Mechatronics in Marine Technology	0/0/4/0	5
mt525	Marine Propulsion Systems	0/0/0/2	2
wi1089HWBC	Partiële differentiaalvergelijkingen		3
wi2090	Continuüm mechanica I		5
wi3025	Continuüm mechanica II		6
wi4007tu	Fourier- en Laplace-transformaties		4
wi4011	Numerieke stromingsleer		6
wi4014tu	Numerical Analysis c2		6
wi4048	Mathematische methoden in de hydrodynamica		6

1.5.1.2. SHIP AND OFFSHORE CONSTRUCTION FOCUS AREA

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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 at shipyards and design agencies bear responsibility for shape, choice of materials, production technology and the dimensioning of the connecting parts. An important complication in this respect is that the fracture safety in welded constructions does not relate exclusively 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 much part of the curriculum as are 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 present, there are job opportunities with the following types of employer.

- Engineering consultancy firms.
- Oil industry
- Classification societies.
- Shipyards.
- Research institutes (eg. TNO).
- The Navy.

Within this section, there are various focus areas which are reflected in the scientific research carried out at the Ship Construction Laboratory.

The section concentrates mainly on the effects of a construction's topology, material and manufacturing influences (imperfections, residual stresses, etc.) on its behaviour under varying loadings due to the seaway (fatigue) and at low temperatures (brittle fracture). It is also concerned with impact-resistance and plastic collapse under compression.

Another field of study is the control of vibrations and noise generated by propellers, engines, pumps, ventilation systems, waves and so on. There is 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 fourth year of study, there is ample opportunity to become involved in ongoing laboratory research or to participate in practical projects.

Examples of recent MSc projects

- Numerical simulation of the impact strength of a Y-shaped shell structure during collision.
- Optimisation of structural configurations for superstructures of megayachts.
- 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.
- Optimisation 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 GRP woven fabric laminates.
- Evaluation of the reliability of the hull girder of an 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.

Curriculum

This focus area features only two mandatory courses. After 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 regarding his or her future career and, if possible, the final project are taken into account.

Compulsory courses: Ship and Offshore Constructions focus area

Course code	Course name	Contact hours	EC
mt815	Ship Construction and Strength Special Subjects	0/0/3/0	2
mt830	Application of FEM	0/0/0/4	3

Recommended elective courses:

Ship and Offshore Constructions focus area

Course code	Course name	Contact hours	EC
ae3-525	FEM in constructies		3
ae4-528	Computerized structural analysis		3
ae4-533	Stab. v Dunwandige Constr. I		4
ae4-534	Stab. v Dunwandige Constr. II		3
ae4-535	Constr. Ontw. & Optimalisatie A		3
ae4-535	Constr. Ontw. & Optimalisatie B		3
ct4130	Probabilistisch ontwerpen		4
ct5126	Vermoeing		3
ct5122	Capita selecta: staal, alumin, vvk		4
mt213	Marine Engineering C	0/2/0/0	2
mt218	Mechatronics in Mar. Technology	0/0/4/0	4

mt515	Resistance and Propulsion 3	2/2/0/0	3
mt524	Hydromechanics of Special Ship Types	0/0/4/0	3
mt525	Marine propulsion systems	0/0/0/2	2
mt816	Composite Materials for Ship Construction	0/0/0/2	2
ot4623	EEM voor Offshore Technologie		4
wb1405A	Stability of Thinwalled Structures I	0/0/4/2	4
wb1406-05	Experimental Mechanics	0/0/2/2	4
wb1409	Theory of Elasticity	2/2/0/0	3
wb1412	Non-Linear Vibrations	0/0/2/2	3
wb1416	Num. Methods for Dynamics	0/0/2/2	3
wi3025	Continuum Mechanics II		6

1.5.2 DESIGN, PRODUCTION AND OPERATION SPECIALISATION

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This specialisation encompasses a number of focus areas, each of which provides ample opportunity to combine in-depth technical study with other, more general, topics such as logistics, management, finance, technical marketing and sustainability. As such, this specialisation is tailored for students of the applied maritime sciences. It will be of particular interest to those aiming to be an all-round maritime graduate rather than a specialist.

Within this specialisation the student may choose between the following focus areas.

- Marine Engineering (ME).
- Ship Production (SP).
- Ship Design (SD).
- Shipping Management (SM).
- Offshore Units Design (OD).

Any of these may be combined with the following annotations.

- Technical Marketing
- Sustainability

This specialisation includes 22 EC of compulsory subjects, spanning a wide range of relevant topics. These are shown in the table below.

Curriculum

Compulsory courses: Design, Production and Operation specialisation

Course code	Course name	Contact hours	focus area						EC
			ME	SP	SD	SM	OD		
mt217	Design Methodology & Knowledge Eng.	2/0/0/0	o	o	o	o	o	4	
mt218	Mechatronics in Maritime Technology	0/0/4/0	o	o	o	o	o	5	
mt729	Maritime Business Game	0/0/0/4	o	o	o	o	o	3	
oe4603	Introduction to Offshore Structures	0/4/0/0	o	o	o	o	o	3	
wm0732mt	Maritime law	4/0/0/0	o	o	o	o	o	3	

Compulsory courses: Design, Production and Operation focus areas

Course code	Course name	Contact hours	focus area						EC
			ME	SP	SD	SM	OD		
mt213	Marine Engineering C	0/2/0/0	o					2	
mt112	Ship Design 3	4/0/0/0			o		o	3	
mt113	Design of Advanced Marine Vehicles	0/4/0/0			o		o	3	
mt313	Shipping Management	0/0/4/0				o		3	
mt514	Ship Motions and Manoeuvring 3	0/0/0/4			o		o	3	
mt515	Resistance and Propulsion 3	2/2/0/0			o			3	
mt727	Shipyards Process Simulation and Strategy	0/0/2/0		o				4	

ot4652	Floating Offshore Constructions	0/4/0/0					o	3
ot4661	Offshore Moorings	0/0/4/0					o	3
wb3420-03	Logistics: Introduction	2/2/0/0					o	5

Recommended elective courses: Design, Production and Operation focus areas

Course code	Course name	Contact hours	focus area						EC
			ME	SP	SD	SM	OD		
ae4-496	Maintenance Technology		r					3	
ct4330	Ports and Shipping Lanes 1							3	
ct5306	Ports and Shipping Lanes 2							3	
in4013tu	Expert Systems in a Technical Environment	0/2/2/0	r					4	
mt112	Ship Design 3	4/0/0/0					r	3	
mt113	Design of Advanced Marine Vehicles	0/4/0/0					r	3	
mt213	Marine Engineering C	0/2/0/0			r		r	2	
mt525	Marine Propulsion Systems	0/0/0/2	r		r	r	r	2	
mt724	Ship Finance	0/0/2/0		r				2	
mt725	Inland Shipping	0/2/0/0		r				2	
mt816	Composite Materials in Shipbuilding	0/0/0/x			r		r	2	
oe4625	Dredging and Slurry				r		r	4	
oe4626	Dredging Processes				r		r	4	
tn3713	Advanced Thermodynamics		r					3	

wb1321	Heat and Mass Transfer	0/0/4/0	r						3
wb1413-04	Multi-Body Dynamics	0/0/2/2	r						4
wb2310	System and Control Technology	0/4/0/0	r						4
wb2400	Process Control	0/0/2/2	r						3
wb3410-03	Large-Scale Transportation Systems	0/0/2/0			r		r		3
wb3417-03	Discrete Systems: MPSC	2/2/0/0					r		4
wb4408A	Diesel Engines A	0/0/4/0	r						4

Recommended elective courses (follow-up): Design, Production and Operation focus areas

Course code	Course name	Contact hours	focus area					EC
			ME	SP	SD	SM	OD	
wb4408B	Diesel Engines B	0/0/0/4	r					4
wb4410A	Refrigeration Fundamentals	2/2/0/0	r					3
wb4420	Gas Turbines	2/2/0/0	r					3
wb4421	Gas Turbines Simulation and Application	0/0/2/2	r					3
wb4424	Indoor Climate-Control Design	0/0/2/2	r					4
wb4426	Indoor Climate-Control Fundamentals	0/0/2/2	r					3
wb4427	Refrigeration Technology and Applications	0/0/2/2	r					3
wi4019	Non-Linear Differential Equations	0/4/0/0	r					6
wi4070tu	Digital Simulation A	4/0/0/0				r		4
wm0102tu	Psychology of Work	0/0/2/2			r		r	3
wm0301tu	Introduction to Philosophy for Technologists	0/2/0/0	r					3
wm0324lr	Ethics and Technology LR		r					3

wm0605tu	Business Economics for Engineers	2/0/0/0					r		2
wm0801tu	Introduction to Safety: Methods and Techniques	0/4/0/0	r						3
wm0903tu	Technology and Global Development	0/0/2/2	r						4
wm0909tu	Technology Assessment	0/0/2/2							3
	Design and Engineering Processes						r		3

o = compulsory courses.

r = recommended elective courses.

	focus area				
	ME	SP	SD	SM	OD
Total EC, compulsory courses	20	22	30	26	33
Total EC, elective courses	40	38	30	34	27
Total EC	60	60	60	60	60
MSc thesis (second year)	60	60	60	60	60
Total EC, MSc programme	120	120	120	120	120

1.5.2.1 MARINE ENGINEERING FOCUS AREA (ME)

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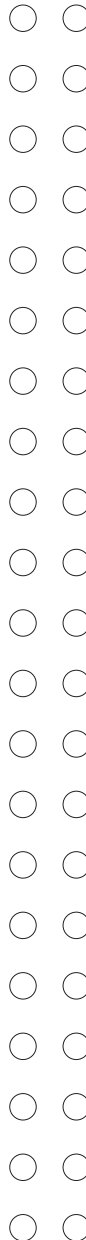
Marine Engineering covers the design, installation and operational use of ship machinery and electrical plants. It covers a wide variety of systems, including ships' propulsion plants, electric power generation, refrigeration and climate control and auxiliary systems for cooling and lubrication, cargo handling, loading and unloading.

The main issue in this discipline is "installation technology": the integration of different equipment to create well-functioning, efficient and cost-effective systems. This requires extensive knowledge of machinery and electrical equipment (operational principles as well as such characteristics 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.

Students specialising in Marine Engineering have a wide choice of elective courses. These account for approximately 36 EC. The Master's thesis is worth 60 EC and in many cases is prepared in co-operation with industry or an external research institute. The focus area has good contacts with universities abroad, which gives students the opportunity to take courses or write the thesis in another country.

The Master's thesis cover one of the research topics in which the section is active.

- Investigating the dynamic behaviour of machinery systems.



- To do this, much effort is devoted to developing simulation models of equipment and systems and to the dynamic simulation of complete systems.
- Maintenance engineering. The development of cost-effective and safe maintenance plans, as well as work on intelligent condition monitoring. Use is made of artificial intelligence and system simulations.
- Developing new design tools and innovative system designs;

The thesis may be either practical or more fundamentally theoretical in nature.

Examples of recent Master's thesis topics.

- Development of a simulation model of a dredging pump.
- Technical and economic investigation of 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 economic decision model for spare parts to be carried on board.

1.5.2.2 SHIP PRODUCTION FOCUS AREA SP)

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

Important areas of interest...

- 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) used to manufacture it, including the optimisation of the latter.
- The factors of production and constraints involved in shipbuilding, such as labour, technology, environmental considerations and access to capital.
- The building strategies, ranging from doing everything in-house through subcontracting and co-makership to large-scale outsourcing and from labour-dominated to fully automated working methods.
- The flow of materials, information and people in the process, and all the interactions that take place between them.
- 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 the financial analysis of shipyard performance.
- The dynamics of the worldwide shipbuilding and repair market, including price developments, new building volumes, globalisation, subsidies, niche markets and second-hand pricing.
- Decision-making processes to harmonise all of the above and to develop strategically sound approaches to various problems.

Shipbuilding involves constructing mobile objects in a transparent, global market. The industry faces worldwide competition in which the various factors of production and efficiencies decide the success of an individual company. Ships are complex objects, invariably made as a one-off or in very small series. The fact that they operate in harsh environments and have to be able to sail autonomously for weeks or sometimes even months at a time results in a multitude of systems which must all be mutually integrated and fitted to the vessel's steel, aluminium or composite structure of

the ship. Graduates of Ship Production are expected to be able to oversee this complex process at the various levels of aggregation and to synthesise its many aspects into a sound decision-making model.

Research

Research in Ship Production focuses upon the following areas.

- Identifying those parameters affect the various parts of the shipbuilding system and investigating the cause and effect relationships between them.
- Researching the qualitative and, as far as possible, the quantitative models describing those relationships.
- Researching optimum management and control strategies to streamline and rationalise processes.
- Developing the methodology and technology for the proper application of research results in practical situations.

The precise choice of topics is of course driven both by the expected medium and long-term developments in basic technology and by the way in which the industry is expected to evolve. This research is co-ordinated within a single TU Delft research programme, Intelligent Shipbuilding & Shipping Processes, a full description of which is available on the internet. In this, the section co-operates intensively with Ship Design and with the Shipping section of the Institute of Transport and Maritime Management (ITMMA) at the University of Antwerp.

Based on this "core business", the section participates in industrially relevant applied research. While the Dutch shipbuilding sector is our primary partner in research and education, the section's horizon stretches across Europe and beyond, into the global shipbuilding market. Here are some typical examples of recent research projects.

- Developing robots for the building of small and medium-sized ships in small series.
- Planning and job preparation at 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 co-operation with the Dutch industry, the following projects are to be undertaken together with other major players:

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

Ship production and research into it require the synthesis of many topics. Since the section does not work on specialised but vital technologies such as ICT and robotics, co-operation with dedicated groups within TU Delft and elsewhere is explicitly pursued.

Other maritime fields covered by the section

As well as the core activities highlighted above, the section provides specialist knowledge and courses on the following subjects.

- Inland Shipping.
- Ship Repair and Marine Salvage. This is taught at the MSc level and may also serve as the basis for specific graduation research work.

Graduation work

Thesis subjects should preferably fall within the focal area of the section's research programme, although this is not absolutely necessary. Our relationship with industry not only benefits such research, it also opens interesting opportunities for graduation work placements.

1.5.2.3 SHIP DESIGN FOCUS AREA (SD)

- **Professor:** Prof. A. Aalbers
Tel: +31 (0)15 27 81732
E-mail: a.aalbers@3me.tudelft.nl



- **Deputy:** H. Boonstra
Tel: +31 (0)15 27 81521
E-mail: h.boonstra@3me.tudelft.nl
- **Secretary:** Ms. A. Nieuwland-Jobse
Tel: +31 (0)15 27 83882
E-mail: a.nieuwland@3me.tudelft.nl.

Ship Design can be characterised as reaching a synthesis of knowledge which creates a vessel capable of operating in the best and most economical way in a harsh marine environment. These in this focus area are generally written in co-operation with businesses such as shipyards and shipowners, a unique approach which provides students with the opportunity to study and develop current topics and which guarantees a paper based on the technical and economic information.

Possible thesis subjects.

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

Here are some examples of recent theses.

- The development of a new multifunctional vessel for major salvage operations at sea.
- A design study of a 2.2 million barrel oil tanker with a double skin.
- The influence of the tank arrangement on the design of chemical tankers.
- The design of seagoing container vessels with a dedicated system of transfer to inland barges.
- A concept for an exploration model for semi-submergible platforms.
- A design study for a single-point moored tanker for oil production.

The section's own fields of research include safety and the environment, CAD/CAM design and calculation models and the design of advanced marine vehicles.

Graduates from this focus area find work with organisations of the following types.

- Shipyards.
- Independent engineering firms.
- Shipowners.
- The Navy.
- Universities.

Because the Ship Design is actually the most multidisciplinary of all Marine Technology focus areas, it opens the way to a broad range of careers.

1.5.2.4 SHIPPING MANAGEMENT FOCUS AREA (SM)

- **Professor:** Prof. E. van de Voorde
Tel: +32 (0)3 220 4157
E-mail: eddy.vandevoorde@ua.ac.be
- **Deputy:** J. Frouws
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- **Secretary:** Mrs. A. Nieuwland-Jobse
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This focus area is offered jointly by TU Delft and the Institute of Transport and Maritime Management (ITMMA) at the University of Antwerp. It is headed by Professor E. van de Voorde of ITMMA, with co-ordination the responsibility of J. W. Frouws of TU Delft.

The Chair of Shipping, Ship Innovation and Shipping Management is part of the Ship Design section.

Marine Technology teaches students how to design ships for a mission, such as cargo transport or services. And one part of the process which translates a mission into a new ship is determining the demands which will be made of it. These come in part from national and international organisations like the IMO, Lloyd's Register and the Shipping Inspectorate



– but just as important are the demands made by the market and the customer.

It is that latter category which is the domain of the Chair in Shipping, Ship Innovation and Shipping Management and MSc focus area in Shipping Management. This concentrates on how ships are used and the demands that places on them. This generates questions of the following kind.

- What am I going to be using my ship for?
- What type of ship should I use?
- Do I order a dedicated vessel like an oil tanker or a more flexible one like an OBO carrier?
- What size must my ship be?
- Do I buy a new ship or a second-hand one?
- Where do I build my ship: in the Far East or Europe?
- Is a whole new design concept needed?

These are but a few of the relevant questions. To answer them properly, shipowners need to look very carefully at their environment. They have to consider whether there is a need for their service: enough demand for capacity to make the ship profitable. Answering that means conducting market analyses, studying cargo flows and observing the competition.

A shipowner may concentrate on a large market like oil market or bulk cargo, but they may choose to target a niche such heavy lift transport. In the first case they will be one of many players and so have little influence over the market, but in the second they become an important player with a high level of specialisation. Both types of market have their advantages and disadvantages, and both also have specific effects on ship design. Niche markets often require specialised, advanced types of vessel.

Shipowners consider vessel design from the operational viewpoint. One cannot design a good ship without knowledge of operations, the shipping world, cargo markets, financing, and so on. 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 knowledge drawn from this complex environment.

By distinguishing themselves in this way, shipowners can gain a competitive advantage. One example is the HSS high-speed ferry operated by Stena Line which, with a speed of 40 knots, has made the crossing between Holyhead (UK) and Dun Laoghaire (Ireland) much faster. This benefits the passenger, of course, but it also means that the shipowner can better utilise the vessel. One ship may now be able to make two crossings a day instead of the previous one. And that can increase revenue and profit, despite the higher cost of building and operating the vessel. In fact, the HSS has been so successful that Stena Line has now decided to introduce on the route between Harwich and the Hook of Holland.

Most graduates of this focus area find work in the shipping industry, for shipowners, transport companies, shipping financiers, maritime researchers, government agencies and so on. As member of the Netherlands Association of Shipping Experts (NVVR), they remain in regular contact with one another.

1.5.2.5 OFFSHORE UNITS DESIGN FOCUS AREA (OD)

- **Professor:** Prof. A. Aalbers
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E-mail: a.aalbers@3me.tudelft.nl
- **Deputy:** H. Boonstra
Tel: +31 (0)15 27 81521
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- **Secretary:** Ms. A. Nieuwland-Jobse
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E-mail: a.nieuwland@3me.tudelft.nl

This focus area is provided by the Ship Design section and covers the design of floating structures used for industrial activities at sea. For example, semi-submersibles, tensionleg platforms, self-rising islands and one-point moored tankers. In many cases, the activities carried out aboard these structures are related to offshore oil and gas exploration or production. But they



can also include dredging, mining, energy production and civil engineering or salvage operations. This discipline focuses on the design of such constructions and their specific hydrodynamic and structural aspects.

In many cases, one of the other disciplines in Marine Technology is a leading factor in the design of a structure of this kind. When a student wishes to work on such a design, the two sections concerned will join forces and assume joint responsibility for supervising his or her studies.

The general fields of study in Offshore Units Design are as follows.

- Design of units or of a part of them.
- Feasibility studies of new concepts.
- Development of design tools.
- Technical and/or economic optimisation of units.

Typical examples of thesis subjects are...

- Development of a computer program for the analysis of jack-up platforms;
- Design aspects of dynamically 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 undersea equipment.

Graduates from this focus area usually find work with engineering firms, oil companies, shipyards, classification societies, research institutes, construction companies and the like.

1.5.3 ANNOTATIONS

As an addition to the focus area programme students can take two annotations to broaden their knowledge on a certain subject. After completion of such an annotation, the student gets a supplement to the MSc degree which declares a more than average knowledge about that subject has been obtained. These annotations are:

- a Technical Marketing
- b Sustainable Development

The study programme including an annotation has to comply with the requirements of paragraph 1.2 (120 EC).

a) Annotation Technical Marketing

The responsible lecturer for Technical Marketing is *prof. mr. dr. Sicco C.Santema* (tel. +31 (0)15 27 83076). The Coordinator is H.M.J.J. Snelders (tel: +31 (0)15 27 83108).

The Technical Marketing annotation offers students the possibility to gain 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 their area. The study programme will be determined in consultation with the student, the lecturer responsible for the focus area and the lecturer responsible for Technical Marketing, Prof. mr. dr. ir. Sicco S. Santema. The marketing component in the study programme consists of at least 16 EC marketing courses and 16 EC of the MSc thesis should be devoted to marketing aspects. This means that a significant part of the elective courses has to be used for technical marketing. The marketing content of the MSc thesis complement the chosen focus area. The thesis should provide a synthesis between technology and marketing. Normally this part involves a marketing research study for products which still have to be developed, or a market introduction study for products already developed 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 focus area and a technical marketing lecturer will act as supervisors.

Obligatory courses annotation Technical Marketing

Course code	Course name	Lecture hours	EC
ID4141	Consumer research	0/0/3/3	6
ID5131	Business marketing for engineers	0/0/2/0	3
IDE511	Integral aspect of business marketing	0/0/0/4	3
Total			12

Recommended Elective courses annotation Technical Marketing (at least 3 EC)

Course code	Course name	Lecture hours	EC
wm0720	Business law A / Company law	0/0/4/0	3
wm0115	Conflict handling and negotiation	0/3/0/0	2

Other courses in consultation with coordinator Technical Marketing and the lecturer of the chosen specialisation.

b) Sustainable Development annotation

Sustainable Development (SD) is an issue of growing concern in many research projects and is becoming an increasingly essential element of political and organisational decision making.

Nowadays, technology is playing an important role in approaches to sustainability-related problems. For this reason, Delft University of Technology now offers students the opportunity to specialise in SD.

The SD annotation recognises knowledge of sustainable development and technology both in breadth and in depth. The in-depth knowledge is acquired through the preparation of an MSc thesis in which SD issues are included as a central element of the focus on the discipline concerned. Every faculty has a dedicated SD lecturer with the specific expertise to assess such a thesis.

Knowledge in breadth is guaranteed by the colloquium Technology in Sustainable Development (wm0922tu, 4 EC) and a number of elective courses in the field of SD (at least 11 EC).

Further information on SD-related courses and opportunities can be found at www.odo.tudelft.nl or obtained from the co-ordinating lecturer on sustainable development for Marine Technology, J. W. Frouws (Tel: +31 (0)15 27 86606, E-mail: j.w.frouws@3me.tudelft.nl). For enquiries concerning the colloquium and enrolment, contact Gertjan de Werk (E-mail: g.dewerk@tbm.tudelft.nl).

1.6 ENROLLING FOR COURSES AND TESTS

Usually it is necessary to enrol for modules and tests.

Modules

Students can enrol for specific modules through Blackboard. Most of the communication between lecturer and students runs via Blackboard announcements. Exchange of information, assignments and reports often takes place via Blackboard also.

Tests

Enrolling for tests is compulsory and can be done at the TAS site (Tentamen Aanmeld Systeem 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.

1.7 PASS RULES AND CRITERIA FOR 'CUM LAUDE'

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.

'Cum laude'

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:

- the mark awarded to the components specified in the Master's examination implementation procedures shall average no less than 8, excluding the Master's Thesis in a list that contains no marks below 6;
- the candidate concerned shall have completed the Master's degree



- programme in no more than three years;
- the mark awarded for the thesis project shall be no less than 9;
- the examiner of the graduation assignment shall have submitted a proposal for the award of "cum laude".

This is part of the "Regulations and guidelines for the Board of Examiners", appendix 6.1 of this study guide.

1.8 HONOURS TRACK

For excellent students it is possible to follow an honours track for their programme. An honours track is a special individual programme, in addition to the regular Master's programme, of 30 EC (840 hours) and is related to Materials Science and Engineering and / or to the role of technology within society. The extra programme has to be completed during the Master's programme of the student. Students who have successfully completed their honours track receive a special certificate from the university. Students who have finished the Bachelor's programme with a weighted averaged mark of 7.5 or higher and students who have shown an excellent performance during the first semester (no fails and weighted averaged mark 7.5 or higher), are eligible for following the honours track in their Master's programme. The Director of Education is responsible for the programme of each individual honours track.

1.9 STUDY AND INTERNSHIP 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 expand 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 during your search for a permanent 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 initial information on studying abroad you are advised to visit the Back Office International Programmes of the Student Facility Centre. Much documentation about study abroad is available from this Centre, like information on all universities with which exchange agreements exist, possibilities of financing, and travel reports from students. Information is also available on the website: www.sfc.tudelft.nl. If you have a clear idea about where you want to go to, you can ask the Coordinator for International Exchange for advice 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 12 EC to the Master's 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.

Internship

Usually an internship is arranged via one of the staff members of the department. In addition to this you can visit the Information Centre of the Student Facility Centre (see above). They offer a lot of information, not only on a large number of companies abroad, but also on finance-related affairs, working permits, visa, etc. Additional information is available from the website: www.sfc.tudelft.nl.

International Coordinator 3mE

Mrs M.P.I. Toppenberg

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2628 CD Delft

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Fax: +31 (0)15 27 88340

E-mail: m.p.i.toppenberg@tudelft.nl



1.10 PROFILE OF THE MARINE TECHNOLOGY ENGINEER

MSc Marine Technology graduates find their jobs in nearly all branches of industry, in management, design, research, development or technical departments. An increasing number of them are advising on or selling high-grade products and capital-intensive equipment. In our technologically advanced society, government agencies constantly need people with high-level technical qualifications – for example, to help in policymaking. There is a place for Marine Technology experts in scientific education.

The combination of the broad-based BSc programme and the wide choice of focus areas available at MSc level makes Delft Marine technology graduates highly employable in a variety of professions. These include designer, scientific researcher, organisational expert and IT consultant. Many advance quickly to management positions within a short period: within about a year of graduation, between 25 and 30 per cent are leading teams averaging five or six people.

2 Organisation

2.1 FACULTY

The faculty 3mE offers the study programmes Biomedical Engineering (BME), Materials Science and Engineering (MSE), Mechanical Engineering (ME), Marine Technology (MT), Systems and Control (SC) and Offshore Engineering (OE). The faculty also participates in the interfaculty MSc programmes Transport, Infrastructure and Logistics (TIL).

3mE is an abbreviation of Mechanical, Maritime and Materials Engineering. 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 Director of Education. 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. M. Waas
Room: 8F-1-14
Tel: +31 (0)15 27 85401
E-mail: m.waas@tudelft.nl

2.2 EDUCATION AND STUDENT AFFAIRS

The education and student affairs staff is responsible for providing support to Mechanical Engineering students. Students can obtain information on all issues related to the Mechanical Engineering programmes. The department consists of the following staff:

Dr. Eric Logtenberg
Manager Department O&S
Tel: +31 (0)15 27 89520
E-mail: e.h.p.logtenberg@tudelft.nl



Dorothea Brouwer
Assistant Coordinator Education
Tel: +31 (0)15 27 83302
E-mail: d.j.w.m.brouwer@tudelft.nl

Fatma Çinar
Assistant International Coordinator
Tel: +31 (0)15 27 86753
E-mail: f.s.cinar@tudelft.nl

Teuni Eden
Study Adviser
Tel: +31 (0)15 27 82176
E-mail: t.eden@tudelft.nl

Ewoud van Luik
Coordinator Education
Tel: +31 (0)15 27 85734
E-mail: e.p.vanluik@tudelft.nl

Susanne van der Meer
Secretary and Quality Assurance
Tel: +31 (0)15 27 85734
E-mail: s.d.w.m.vandermeer@tudelft.nl

Dr. Dick Nijveldt
Educational Adviser
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Prof. Dr. Peter Wieringa
Director of Education
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Jaap v.d. Zanden
Study Adviser
Tel: +31 (0)15 27 82996
E-mail: j.vanderzanden@tudelft.nl

Education and Student Affairs
Mekelweg 2
2628 CD Delft
Location 8C, ground floor
Tel: +31 (0)15 27 85499
Fax: +31 (0)15 27 88340

2.3 EDUCATION COMMITTEE

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

Chairman

Ir. G. Hommel
Tel: +31 (0)15 27 86507
E-mail: g.hommel@tudelft.nl

Secretary

Mw. S.D.W.M. van der Meer
Tel: +31 (0)15 27 85499
E-mail: s.d.w.m.vandermeer@tudelft.nl



2.4 BOARD OF EXAMINERS

The Board of Examiners consists of all lecturers involved in the study programme, as mentioned in paragraph 1.5.

The Board of Examiners is responsible for the rules and regulations of the examinations and the assessment of the examination results. Requests for a deviation to the standard programme can be submitted to the Board of Examiners.

Chairman

dr.ir. J.A. Keuning
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E-mail: j.a.keuning@tudelft.nl

Secretary

E.P. van Luik
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2.5 FROUDE STUDENT SOCIETY

Het Scheepsbouwkundig Gezelschap William Froude – usually known simply as “Froude” – is a society run by and for students of Maritime Technology. With their interests at heart, it organises a wide variety of both practical and social activities.

Social activities

As a first-year student, you will encounter the activities “Froude” has to offer from the day you start at TU Delft. The year traditionally begins with a First-Years’ Weekend, the opportunity to meet your fellow students and find out more about the course you are about to embark on. A few weeks into the year, Froude nominates two students from higher years as your “mentors”. They will help you with your studies in any way they can. To increase the bond between students in all years, a Maritime Café is organised once a month at the Lagerhuysch, our own bar situated beneath the faculty. Another major annual event is the May Party which, along with the football tournament and barbecue held earlier the same day, always attracts a lot of students from all over Delft.

Education

One of Froude's key practical tasks is educational quality control. The society plays a crucial part in communications between students and the teaching staff. For example, "response groups" made up of students from each year provide vital information about any problems with classes, examinations and so on. Information is also shared in day-to-day contacts with members. This enables Froude to act as the students, giving them a say over education and the curriculum.

Froude also helps to organise promotional activities for Maritime Technology, including a stand at the huge annual HISWA boat show in Amsterdam.

As well as linking students and staff, Froude provides a connection with the business world. Lectures and symposia are organised to keep up with the current events in the maritime industry and, with help from its network of former members, Froude organises visits to and workshops at companies in the Netherlands and abroad. Every year there are about ten half-day excursions to maritime companies within the country, as well as an annual one-week trip to a European destination. And once every two years you can visit somewhere farther afield, such as Korea or the United States. Students can "earn" their place on that trip – and at the same time put their academic knowledge into practice – by working at maritime company for three weeks. Moreover, sponsorship keeps the cost of the excursions extremely low. Giving you a chance to see the whole maritime world in action, these trips are an unmissable complement to your studies.

Visit us

Froude has its own office on the ground floor of building section 8B. Here you will always find a cup of coffee and somebody to have an interesting or fun conversation with.

You are welcome at any time, whether you want to ask about different classes, complain about exams or just chat. It is of great importance to us to hear what is going on in the faculty, as that gives us something to work with. And apart from that, we enjoy the company. So we hope to see you often.



SG "William Froude"

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Fax: +31 (0)15 27 85602

E-mail: froude@tudelft.nl

Website: www.froude.tudelft.nl

Other student societies

As well as Froude, there are several other student societies of particular interest to marine technologists.

- Delft Waterbike Technology (DWT): www.dwt.tudelft.nl.
- Delft Yachting Syndicate (DYS): www.froude.tudelft.nl/dys.
- Dispuut Offshore Technology (DOT): www.dot.tudelft.nl.
- Scaphatus (sloop rowing) www.scaphatus.tudelft.nl.
- Vulcanus (maritime engineering) www.ocp.tudelft.nl/vulcanus.

2.6 STUDENT GUIDANCE

For assistance and advice to students the faculty has two study advisers. The study adviser is the person to see about questions or problems related to your studies or issues which may influence your ability to study. The study adviser also acts as a confidential contact to students.

Individual help and advice

The study advisers have no teaching responsibilities and can, therefore, devote themselves to helping individual students solve problems which may be an obstacle to their academic progress. They are also involved in several committees and are in contact with the lecturers, so they are always up-to-date with the latest developments in the Mechanical Engineering programme. They are in contact with the study advisers at the other TU Delft faculties and with those outside the University; they know what is going on in their field.

Personal circumstances

Personal information will often be discussed during a talk with a study adviser.

You can be sure that this information will be dealt with confidentially. This kind of information will only be used with your permission for requests to make an exception to TU Delft or faculty regulations.

Advice to the Board of Examiners, a professor, ...

Under certain conditions a study adviser can decide to advise for example the Board of Examiners to change a decision in favour of a specific student. If necessary the study adviser will act as intermediary between student, dean, psychologists and family doctors. The degree to which the study adviser helps a student is up to the student. The study adviser keeps an eye on the academic progress of all students and may contact them if necessary, but you are strongly recommended to contact the study adviser yourself when facing a question or problem. Waiting often only makes the problem worse. You can contact the two study advisers of the faculty with any questions. They also have their own specialisms.

Foreign Student Financial Support (FSFS)

The Delft University of Technology provides financial assistance to foreign students in cases where they face a study delay due to special circumstances like an illness, a physical or sensory disorder, mental problems, and insufficient organisation of the educational programme by the faculty.

Mrs Teunie Eden, study adviser for all 3me BSc and MSc students, as well as harassment counsellor (see below)

Specialisms: Exchange students, International MSc students, social programme international students.

Mekelweg 2,

Room 8C, ground floor

E-mail: t.eden@tudelft.nl

Tel: +31 (0)15 27 82176

Jaap v.d. Zanden, study adviser for all 3me BSc and MSc students

Specialisms: Graduate students, polytechnic high school students, quality control, student mentors.



Mekelweg 2, 8C, ground floor
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Tel: +31 (0)15 27 82996

Dyslexia

Students suffering from dyslexia usually have problems reading and understanding long texts. This may hamper 'normal' academic progress. These students are therefore advised to contact one of the study advisers and to set up a remedial plan. Important issues are:

- A planned study delay often helps
- If necessary, extra time for examinations can be requested
- Studying with a fellow student often improves academic progress
- IBG offers extra student grants

2.7 WORKING CONDITIONS, RSI AND HARASSMENT

RSI (Repetitive Strain Injury) is a well-known problem. Within TU Delft, the number of complaints caused by RSI is increasing. Too many employees and students still neglect the first symptoms of RSI, not knowing where to find answers to their questions. A lot of information on this issue is available on the Internet. An example is www.rsi.pagina.nl. Free software can be downloaded from the 3mE website, which can help you prevent RSI: go to www.3me.tudelft.nl > facilities.

Causes

There are two mechanisms that cause RSI:

- Repetitive tensing 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.
- Constant tension of muscles in the neck, shoulders and arms restricts blood circulation and damages nerves. This results in cold and tingling fingers. Mental stress and poor posture increase this effect.

Symptoms

There are various symptoms that indicate RSI: pain, stiffness, tingling and a loss of strength can occur in the neck shoulders, arms, wrists, hands and

sometimes even in the legs. Without rest, these symptoms will only get worse.

Prevention

How to prevent RSI:

- Intersperse repetitive movements, like typing and using a mouse, with non-repetitive ones, like walking to the printer or reading documents.
- Take regular breaks. You are advised to take a 10-minute break after every two hours of work and a 20-second break after every 10 minutes of work in order to improve blood circulation. It is even better to do exercises during these breaks. Anti-RSI software can help in this respect.

- It is strongly discouraged to do more than six hours of computer work a day.
- Make sure that you maintain a good working posture. Arrange the workstation to suit you. 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.

Do not ignore the symptoms of RSI. If you have any questions, please contact the following people:

- Study Adviser
- Health & Safety Adviser: Leen Paauw, E-mail: l.paauw@tudelft.nl
- Student Health Care (SGZ), tel: +31 (0)15 21 21507, E-mail: studentenartsen@sgz.nl
- Student Facility Centre (SFC), E-mail: www.sfc.tudelft.nl
- VSSD support, tel: +31 (0)15 27 82057, E-mail: www.vssd.nl

Harassment

Harassment is inappropriate, unwanted behaviour that is offensive, frightening, or in any way distressing. Teasing, mocking, gossiping, bullying, sexual or racial intimidation, violence and discrimination are all forms of harassment.



Harassment Counsellor

If you have problems you can turn to the Harassment Counsellor appointed by the Faculty. These counsellors operate on a strictly confidential basis and can offer advice, information, support and assistance to victims of harassment. When necessary they may enlist the assistance of mediators. They can also assist and guide you should you wish to submit your complaint to the TU Delft Complaints Committee. All actions are subject to your permission and approval. If you experience any problems in this area, do not hesitate! Everyone at TU Delft has the right to feel safe and respected! The Harassment Counsellor of our Faculty is:

Mrs T. Eden
Mekelweg 2
Room 8C, ground floor
Tel: +31 (0)15 27 82176
E-mail: t.eden@tudelft.nl

2.8 QUALITY CONTROL

The quality of the education 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 and the Director of Education advise the dean.

Internal Quality Control:

- In order to evaluate the opinion of the students, a **course evaluation system** is in place. This system gives all students the opportunity of giving their opinion on the education programme. The study programme and courses are evaluated each year by means of a questionnaire.
- **Evaluation meetings** with students and lecturers.
- Submitting and dealing with **complaints**. These complaints can be lodged with the student society or the Director of Education.
- The faculty regularly evaluates its education programme and research in self-assessments.

External quality control:

- The programmes are accredited every five years by the NVAO (Nederlands Vlaamse Accreditatie Organisatie). In preparation of the accreditation, the programme is evaluated by a visitation committee formed by QANU (Quality assurance Netherlands Universities)

2.9 INFORMATION SERVICES

Study guide

This study guide is the main source of information on the degree programme and is available to all students from the Service Desk of the Faculty.

The most recent information however is always available on the faculty website. Announcements which are of importance for the study, like changes to the schedules, are posted well in advance on the Faculty homepage and on Blackboard. Schedules of lectures, assignments and examinations are available on the campus site. Any changes to these schedules are given on Blackboard. Grades can also be found on Blackboard.

Information not directly related to the programme, like information from the student society 'Leeghwater', will be published on notice boards. Members of 'Leeghwater' are also kept informed by e-mail.

2.10 FACULTY REGULATIONS

- It is not allowed to smoke within the faculty building.
- Students have to follow the instructions of academic and support staff.
- Upon request of a staff member, students shall identify themselves by showing the campus card.
- Students shall be on time, before the lecture, assignment, instruction or meeting starts. The lecturer or student assistant may refuse admission to students who are late.
- Regular times for lectures to start are:

Lecture	Start	End
1st hour:	8.45	9.30
2nd hour:	9.45	10.30
3rd hour:	10.45	11.30
4th hour:	11.45	12.30
5th hour:	13.45	14.30



6th hour:	14.45	15.30
7th hour:	15.45	16.30
8th hour:	16.45	17.30

- All bicycles are to be parked in the racks provided.
- Personal belongings can be stored in lockers located in the main hall. In the corridor alongside lecture rooms A – F bigger lockers are available, suitable for storing helmets. All lockers must be emptied at the end of the academic year, before 15 July and the keys should be returned. Lockers still in use after 15 July will be emptied and provided with a new lock at the student's expense.
- Eating and drinking is only allowed in the canteen, the coffee corner and in the immediate surroundings of a drinks or candy machine.
- Writing or drawing on, or intentionally etching into furniture, walls, doors or windows is prohibited.
- General waste and paper should be disposed of in bins.
- The Rules for Use of Computers, Network Connections, Printers and Plotters should be obeyed.
- Violation of rules and regulations can result in suspension or termination of facilities or services. Theft or intentional damage to Tu Delft property and serious misconduct will be brought to the attention of the proper authorities.

Internet facilities

The utilisation of Internet facilities at the faculty is subject to some regulations:

It is allowed to:

- Send e-mails to persons (or applications) from whom it can be expected that they will not consider the e-mail as annoying. Also, you can receive e-mails which can be stored temporarily in the inbox.
- Read online magazines and to place articles in it.
- Use network information services like WWW servers and FTP servers which are currently in use and those that will become available in the future. All use of services is subject to regulations.
- Use the "Intranet DUNet" on telephones provided throughout the faculty.

It is not allowed to:

- Damage or disable facilities.
- Use available facilities in any other way than their intended use: downloading, uploading and file sharing of copyright-protected items, such as texts, audio and video files in any format is prohibited.
- Download and install any applications on the faculty computers.
- Play computer games using network facilities.
- Make excessive use of the facilities.
- Let a third party use the facilities (including fellow students).
- Do damage to or obstruct other users or equipment linked to the World Wide Web.
- Disrespect other people's privacy, for example by sending information under a false name.
- Become a member of a mailing list outside the faculty without permission of the "dutwmail director". This rule only applies to students.
- Distribute or show material that can be regarded as offensive, for example insulting phrases or pornographic images or movies.

Sanctions:

- The account is deactivated immediately after a violation has occurred.
- In case of serious or repeated violations: prohibition of the use of ICT facilities for up to a year.
- In case of any breach of the law, this will be reported to the police.
- All claims as a result of violations will be passed on to the violator.

3 Facilities

In this study guide, locations in the faculty building are indicated by means of a number and a letter between brackets which can be found on the map on the campus site of 3mE > Facilities. The floor is also indicated (BG= ground floor, 1st = first floor, etc.).

3.1 LECTURE ROOMS / MEETING ROOMS

Lecture rooms are used for lectures, presentations and instruction. The table below summarises all lecture rooms, giving their capacity and location.

Meeting rooms are available for meetings, discussions etc. for small groups of students. Reservations can be made at the Education and Student Affairs desk.

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
P	40	4

3.2 INDIVIDUAL STUDY FACILITIES

Individual study places are available at several locations in the faculty. Some of these are equipped with computers. These places are free to use, without a reservation. Places should be left clean and tidy.

In addition to the study places at the Faculty, there are individual study places in the central library. In the library you are expected to observe silence. There, the same rules apply as those for the faculty study places.

3.3 COMPUTER ROOMS

In addition to the computers at the study places, computers are also available in the computer rooms.

All computers provide access to the Internet. The computer rooms are open for use by students, unless they are being used for teaching. In that case, there is restricted access. A schedule on the door of each computer room shows when the room will be in use. The table below gives an overview of all computer rooms and their location.

Room	Location
Athena	building part 4, 1 st
Parthemus	building part 4, 1 st
Pallas	building part 4, 1 st
Design studios	building part 8G, BG

3.4 RESEARCH FACILITIES

The faculty has a number of research laboratories. Students may perform part of their studies in these laboratories, like the MSc thesis or a laboratory exercise. Otherwise, the laboratories are used for research activities of PhD students and staff.

Hydromechanics Laboratory

Facilities

140 m Towing tank

85 m Towing tank

Cavitation tunnel

Workshop for ship models

Location: 7

Fluid Mechanics laboratory

Contact Laboratory manager: B v.d. Velden

Tel: +31 (0)15 27 82892

Location: Leeghwaterstraat 21



Delft Bio-robotics Laboratory

Facilities Several bi-pedale robots

Contact Laboratory manager: dr.ir. M. Wisse

Tel: +31 (0)15 27 86585

Location: 5, 1st, room 03-L

Engineering Dynamics Laboratory

Facilities Dynamic test equipment and analyzing systems

Contact

Tel. laboratory: +31 (0)15 27 89394

Tel. manager: +31 (0)15 27 86739

Location: 5, BG, room 07

Laboratory for Precision Manufacturing and Assembly

Contact ir. J.J.L. Neve

Tel: +31 (0)15 27 86581

Location: Leeghwaterstraat 37b

Laboratory for process equipment & Thermal Power Engineering

Facilities Pilot scale research equipment and utilities, Analytical equipment, Computational Tools

Contact Laboratory manager: J. v. Os

Tel: + 31 (0)15 27 86921

Location: API building, Leeghwaterstraat 44

Laboratory for Systems and Control

Contact Laboratory manager: ing. R. van Puffelen

Location: 5, BG

Mechanics of Materials Laboratory

Facilities Test machines and analyzing equipment

Contact

Tel: +31 (0)15 27 89394 / 89424

Location: 5, BG, room 07

Tribology Laboratory

Facilities Tribological Test Equipment

Contact Laboratory manager: B. Hoevenaar

Tel: +31 (0)15 27 86805

Location: 5, BG, room 16

3.5 LECTURE NOTES AND BOOKS

Most lecture notes required for courses at the faculty can be bought at the 'repro', as well as some book and office supplies. Books are also available from the student society 'Leeghwater' (www.leeghwater.nl) and VSSD (www.vssd.nl).

Opening hours repro: Monday to Friday, 9:00 - 16:00.

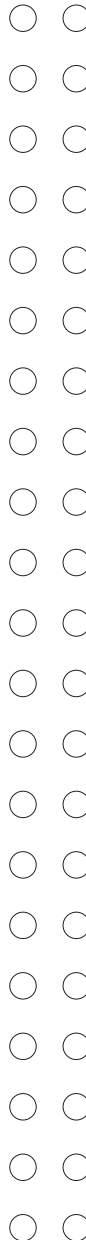
Website: www.io.tudelft.nl/repro/

Tel: +31 (0)15 27 83062

Room: 10, BG (see campus site 3mE > Facilities)

For courses at other faculties, lecture notes can be bought at the faculties concerned:

- Aerospace Engineering
Location: 1st floor
Tel: +31 (0)15 27 81250
- Applied Physics
Room no. C 057
Tel: +31 (0)15 27 87992
- Civil Engineering
Tel: +31 (0)15 27 81727
- Management of Technology
Location: ground floor, next to entrance
Tel: +31 (0)15 27 86373
- Electrical Engineering, Mathematics and Computer Science (EWI)
Room 350
Tel: +31 (0)15 27 87855



3.6 CATERING

The faculty offers a variety of catering facilities.

Canteen

The faculty canteen serves a wide range of lunch choices. The canteen can be found at location 10, BG.

Coffee corner

The coffee corner offers quick snacks. The coffee corner is situated near the main entrance (8F). Chairs, tables and couches are available. Drinks and candy machines are situated opposite the coffee corner. Paying at these machines is only possible with the electronic chip card 'or chipknip'.

Faculty room

The faculty room is the place to hold symposia, meetings or graduation parties ("afstudeerborrels"). A reservation can be made at the Service Desk of the Faculty 3mE.

't Lagerhuysch

't Lagerhuysch is situated below ground level in section 8B, with access from the square in front of the faculty. Graduation parties (afstudeerborrels) can be held in the Lagerhuysch, but also symposia and meetings. The student societies Gezelschap Leeghwater and William Froude regularly organise activities. A route description to the Lagerhuysch and a reservation form can be found on their website: www.lagerhuysch.tudelft.nl.

Aula Congress Centre

The Aula Congress Centre of TU Delft offers a variety of catering facilities. They are open for lunch from 11.30 to 13.30, and for dinner from 16.30 to 19.30.

3.7 MAP OF THE FACULTY

This guide mentions numbers, indicating locations in the faculty building. As an extensive map could not be included in this guide, please visit the 3ME website to view the map: campus.3me.tudelft.nl > Facilities.

4. *Course Descriptions*

Course descriptions of MSc courses are not part of this guide. Detailed information is available in the Digital Study Guide via the Study Information System (SIS) on www.tudelft.nl/sis

5. *Course and Examination Regulations / Regulations and Guidelines for the Board of Examiners*

The Course and Examination Regulations and the Regulations and Guidelines for the Board of Examiners are available on campus.3me.tudelft.nl

