INVENTORY OF OFFSHORE EDUCATION IN SWEDEN

Report April 2014

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In this report the findings from the study "Inventory of offshore related education in Sweden" is presented. Courses and educational programs in the report are taught at universities such as Chalmers University of Technology in Gothenburg, KTH Royal Institute of Technology in Stockholm and the Linnæus University in Kalmar, as well as by individual educators such as companies and organizations located in Sweden.

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1 BACKGROUND

OffshoreVäst is a project dedicated to the harnessing of offshore energy and the supporting activities that it gives rise to. The project aims at strengthening the Swedish offshore sector, both within industry and academia. OffshoreVäst is organized through a consortium of companies, universities, institutes and authorities. The consortium members support OffshoreVäst by in-kind resources, as well as by economic funds. OffshoreVäst also has agreements with national and international strategic partners such as the BSR Stardust pilot MarChain.

Through collaboration OffshoreVäst will contribute to new innovation, research, test beds and demo sites among other projects. The project emanates from Västra Götaland in Sweden, but also includes other regions in Sweden.

Within the consortium of OffshoreVäst, several actors have asked for an updated picture of where they can find offshore related education and competence in Sweden. This report outlines the findings of a study aimed at identifying all offshore-related education in Sweden. This study has been performed within **WP 4 - Offshore Academy** by Andreas Hanning (Chalmers). Additional work has been performed by Christopher Anderberg (Chalmers), Martin Schreuder (Chalmers), John Ohlson (Linnæus University) and Anders Rosén (KTH).

2 PURPOSE AND AIM

The **purpose** of the study is to improve the knowledge of courses and programs within the offshore area in Sweden.

The **aim** of the study is to create an inventory of courses and programs that are focused on the offshore market.

The **goal** of this report is to present a summary of findings up until March 2014, as well as presenting the methodology of the study.

3 METHODOLOGY

The purpose of the study is to improve the knowledge of courses and programs within the offshore sector in Sweden, with the aim of creating an inventory of courses and programs. In order to fulfill the aim of creating an inventory of courses, the methodology of the study is divided into three (3) parts. **Part 1** focuses on identifying relevant information to be collected for the inventory. In this part, a list of relevant information was created in order to aid the information gathering process, see **Table 1**.

Table 1: Information to be collected from different educators.

Swedish column title	English column title	Comments
Lärosäte/utbildningsanordnare	Educator	
Kurs- eller programnamn	Course or program name	
Syfte	Purpose	
Lärandemål	Learning objectives	
Innehåll	Contents	
Ges inom program	In program	
Förkunskapskrav	Prerequisites	
Innehåller miljö och hållbar utveckling	Contains environment and sustainable development	One of the main objectives in OffshoreVäst is to contribute to sustainable development, hence it is important to map whether the programs and courses provide competence within the topic.
Praktik	Practical moments	If the course contains practical stages
Teori	Theoretical moments	If the course contains theoretical stages
WP1 - olja gas	WP1 – oil and gas	
WP2 - förnybar energi	WP2 – renewable energy	
WP3 - service	WP3 – service	
Länk	URL	

Part 2 focuses on gathering course and program information. This has been done by consortium actors with good insight into the courses available at present. At their help, a template Excel file was created for the information gathering process.

After collecting information about the programs and courses, the programs and courses have been sorted based on their respective content. The sorting enabled comparison between programs and courses, presented in section 4 – Results.

Part 3 focuses on the results and drawing conclusions from the gathered information.

4 RESULTS

In total, information about 35 courses and 6 programs have been gathered and analyzed. See **Table 2** for a list of educators and programs in the report.

Table 2: List of educators, programs and courses

Educator	Courses	Programs
Chalmers University of Technology /	13	3 (one program in cooperation with KTH, DTU,

Chalmers Professional Education		Aalto and NTNU)
KTH Royal Institute of Technology	6	2 (one program in cooperation with Chalmers, DTU, Aalto and NTNU)
Linnæus University	6	
Rope Access Sverige AB	4	
JFK Offshore Sweden	2	
Offshoresupporten	2	
Centrum för flexibelt lärande Söderhamn		1
Gotlands Energi	1	
Högskolecentrum Bohuslän		1
Lernia Trollhättan		1
University of Gothenburg	1	
Educator	**Courses**	**Programs**

See section 7 – Appendix, for more detailed information about the programs and courses.

4.1 PROGRAMS

In total, seven programs that relate to the offshore sector have been found at the different educators. Out of these programs, four are M.Sc. programs and three are Higher Vocational Education programs (SW: yrkeshögskoleprogram, YH).

4.1.1 MASTER PROGRAMS

Three master programs are Naval Architecture/Maritime Engineering programs and conducted at Chalmers University of Technology and at KTH Royal Institute of Technology. One of these programs, Nordic Master in Maritime Engineering is a joint program offered by KTH, Chalmers, DTU in Copenhagen (Denmark), Aalto University in Helsinki (Finland) and NTNU in Trondheim (Norway).

These master programs all focus on naval architecture and maritime engineering, hence the programs give the students knowledge in constructing ships and offshore installations that can be used both within offshore and other maritime settings. The master programs all require the students to have a B.Sc. degree (in mechanical engineering or similar) in order to enroll in the programs. The fourth master program is a master program within maritime management.

4.1.2 HIGHER VOCATIONAL EDUCATION

The three Higher Vocational Education programs (HVE) are more diverse. At 'Centrum för flexibelt lärande' in Söderhamn, an HVE program in 'Wind power technician' is offered. At 'Högskolecentrum Bohuslän' an HVE program in 'Maritime Sustainability Coordinator' is offered, and at 'Lernia Trollhättan' an HVE program in 'Mechanical designer' is offered. The maritime sustainability coordinator program is mainly focused on shipping and has only a small connection to the offshore sector. The mechanical designer program is focused on designing mechanical parts for the oil and gas sector, while as the wind power technician program is geared towards offshore wind power.

4.2 COURSES

In total, 35 courses that relate to the offshore sector have been found at the different educators. Out of these 35 courses, 16 courses are at M.Sc. level, one course at B.Sc. level (or similar), and 18 courses are shorter "on demand" courses. The M.Sc. and B.Sc. level courses are all taught within specific programs

hence they are only available to students within the corresponding programs (at KTH and Chalmers respectively). The on demand courses are offered both to program students, and from students coming from industry at a cost. They are offered either solely on demand, or at specific occations during the year.

The 18 shorter on demand courses cover areas such as offshore wind power, Dynamic Positioning, Global Marine Distress and Safety System (GMDSS), navigation, rigging and basic safety in industrial climbing. Common features among all the on demand courses are focus on hands-on experience and practical exercises. The courses all aim at giving the operator or technician an increased level of experience in conducting practical tasks.

4.3 PROGRAM AND COURSE CONTENTS

The programs and courses have been categorized in nine different areas in order to showcase the main focus areas of the programs and courses, and see where gaps exists. These categories are, in alphabetical order: *"Contains: Environment and sustainable development"*, *"Focus: Ice"*, *"Focus: Oil and gas"*, *"Focus: Safety"*, *"Focus: Wind power"*, *"Marine design"*, *"Maritime management"*, *"Maritime operations"*, and *"Practical work"*. "Contains" means that the course or program contains aspects of the subject, and "Focus" means that the program or course has an emphasis on the specific topic.

The rationale for the different course and program contents are as follows. Environment and sustainable development is a subject that a course can contain, as a perspective on a program or course in almost any subject. Ice, oil and gas, safety, and wind power are specific areas that can cover whole courses and programs within the offshore area. Marine design is an over-arching area that relates to ship building, offshore structures and alike. Maritime management is also an over-arching area that focuses on business and transport management. Maritime operations include seamanship and operating ships. Practical work covers courses and programs that focus on skilled labor, such as technicians. All contents in the programs and courses can be seen in **Figure 1**.

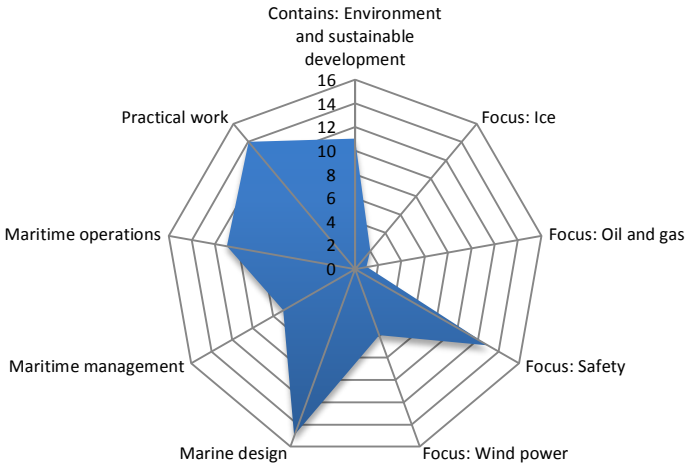

Figure 1: Program and course contents.

In **Figure 1**, the main focus areas of the programs and courses are shown. Contents relating to "Practical work", "Safety", "Marine design" and "Maritime operations" ranks high. Also courses and programs that contain environment and sustainable development rank high as well as and wind power which rank rather high. There is less focus on "Maritime management", "Oil and gas", and "Ice".

Figure 1 gives an overview of all programs and courses, however it is important to note that the M.Sc and B.Sc courses are not available to external students, i.e. people from industry wanting shorter courses. This is something on demand courses, and to some degree HVE programs, can cover to a greater extent. The areas that are covered in on demand courses and HVE programs are shown in **Figure 2**.

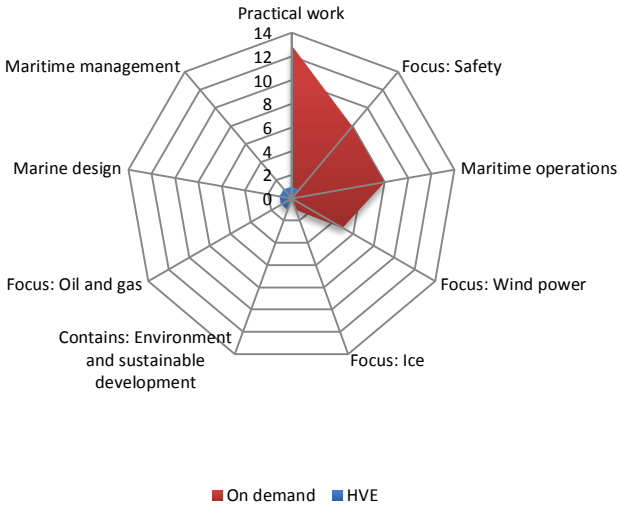

Figure 2: Contents in on demand courses and HVE programs

On demand courses focuses mainly on practical work, safety, maritime operations, and wind power. This is of course market driven, but if the market would need shorter courses within the other areas, this could be raised as an issue to the relevant actors such as Chalmers, KTH or Linnaeus University.

An interesting perspective is to see what types of courses and programs are available at different levels. This can be seen in **Figure 3**.

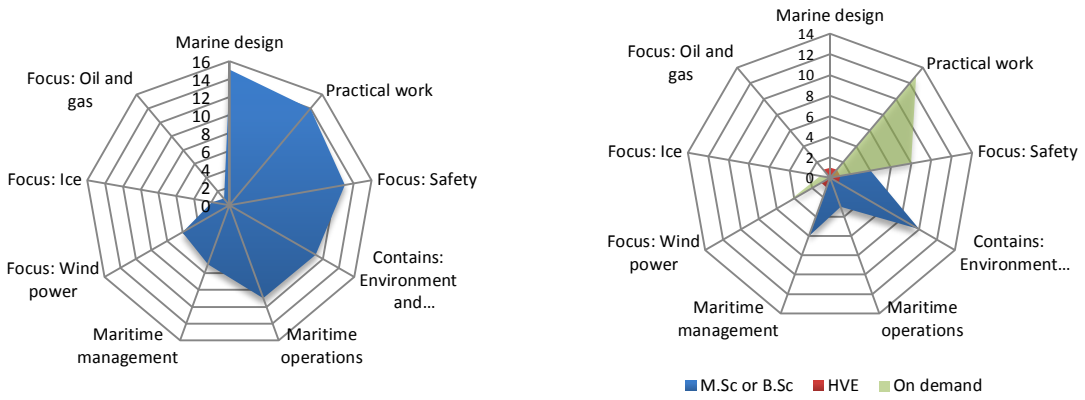

Figure 3: All programs and courses organized from largest to smallest focus (left). Contents in programs and courses, based on course and program type (right).

In **Figure 3** (right), the contents have been sorted based on course and program type. It is thus possible to see that the M.Sc. and B.Sc. courses and programs focus almost solely on "marine design", "environment and sustainable development" and "safety". The HVE programs have a broader spectrum, covering almost all of the topics. The on demand courses on the other hand focus a great deal on "practical work", "safety", "wind power" and "ice".

We can see that the courses and programs within higher education focus more on the design phase of offshore education, whereas the programs and courses within on demand focus on "hands on" competence and practical skills. The HVE programs follow a middle road, offering contents within almost all the topics. It should be noted that the topics are not covered in total by any course or program. For instance, the HVE programs cover many of the topics, but this is because the different programs cover different areas.

Another aspect to address is within which areas there is a focus on supplying programs and/or courses. This is shown in **Figure 4**.

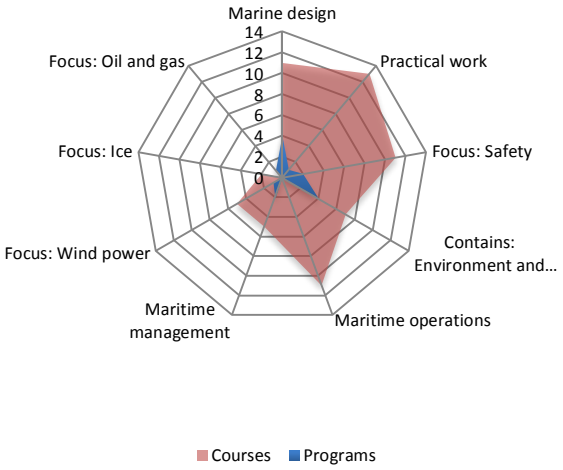

Figure 4: Contents based on programs and courses.

In **Figure 4**, the contents are displayed based on whether they are present in courses and/or programs. We can see that the programs focus on "safety", "wind power", "marine design", "maritime management", and "practical work", and that some of them contain "environment and sustainable development". The courses also focus on these areas, but with an extra large focus on "practical work", "safety" and "maritime operations", as well as "ice" which is not clearly present in any programs. The main gaps are present within "oil and gas". However, many of the practical courses enable the student to work within oil and gas, as well as offshore renewable energy such as offshore wind power.

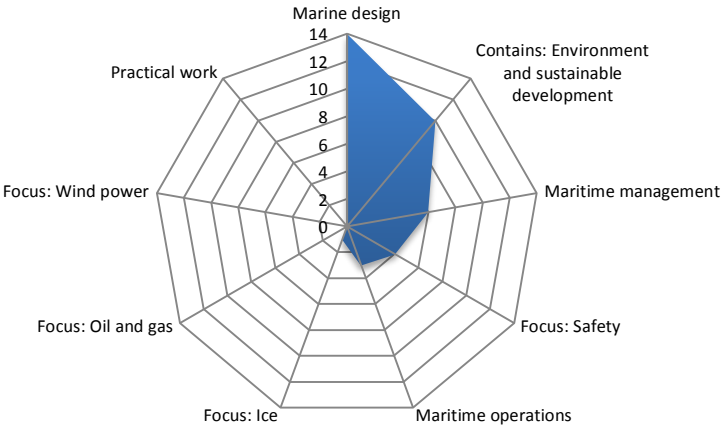

Figure 5: M.Sc and B.Sc courses

In **Figure 5** only the M.Sc and B.Sc courses are shown, which clearly shows the major focus on marine design within these courses. Many of the courses also containa environment and sustainable development, and there are a few courses within maritime management present as well. This showcases that there is a large competence basis within marine design, environment and sustainable development, and maritime management within these courses that could be utilized for shorter industry focused courses.

5 Conclusion

Based on Figure 1, 3 and 4, it is possible to conclude that there is a lack of programs and courses in ice and in oil and gas within the offshore sector. However, this does not implicate that there is a need for starting programs or courses within these areas in Sweden. It only suggests that they are not available at present in Sweden. For instance, programs and courses within these areas might be present in our neighboring countries that cover these areas. And, many of the safety and practical work courses aim at the oil and gas market, as well as the offshore wind market.

There are several courses on M.Sc. level both at Chalmers and KTH. However, many of these courses are directed to students already enrolled in a specific program and cannot be selected by students coming from other areas. For professionals needing competence within a specific area relating to the research competence available within Offshore Academy, this could be brought up to the relevant

people at Chalmers Professional Education, KTH Royal Institute of Technology and Linnaeus University for the creation of shorter industry focused courses.

The shorter courses organized by companies focus almost solely on practical experience and installation and maintenance, be it for the oil and gas industry or offshore wind. It is obvious that offshore wind is on the rise based on the wording these companies use to sell their courses.

There are several courses that focus on offshore wind, even a longer HVE program focusing on wind power technician for the offshore industry. This is something that is not available within the oil and gas sector. However, these courses and programs may be available in Norway and other countries with more focus towards oil and gas, so the market might be saturated. Within offshore wind, this does not seem to be the case. New wind parks being built will require a competence different from the oil and gas industry hence the market for these educations is growing. A study on the Nordic market for offshore education could shed more light on the availability of all types of offshore education.

6 FURTHER WORK

Future studies should look into the available programs and courses within the offshore area in the Nordic countries. This could further show if the gaps in education within Sweden should be addressed by developing courses or if there are programs and courses available elsewhere.

A mapping between the perceived competence need and the supply of programs and courses should be conducted. This report will serve as a good basis for a workshop and future work on this topic.

CONTACT INFORMATION

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7 APPENDIX

7.1 PROGRAMS

University / educator	Program name	Aim	Learning objectives	Contents	Prerequisites	Type of program
KTH Royal Institute of Technology	Master of Science Program in Naval Architecture	Naval Architecture is a multidisciplinary subject with a strong emphasis on systems engineering and engineering design. Graduating students will possess knowledge and experience of the complete processes of conception, design, modeling, implementation and operation of boats, ships, marine installations and other complex systems, along with deep theoretical knowledge in related topics such as lightweight structures, fluid mechanics and management. The programme is characterised by a progressive learning environment with the student in focus, and has a reputation of educating creative and skillful engineers for the maritime sector as well as for other branches of engineering.	Knowledge and understanding A Master of Science in Naval Architecture shall demonstrate: broad knowledge and understanding in naval architecture, scientific basis and proven experience, including knowledge of mathematics and natural sciences, substantially deeper knowledge in certain parts of the field, and deeper insight into current research and development work. deeper methodological knowledge in naval architecture. **Skills and abilities** A Master of Science in Naval Architecture shall demonstrate: ability to, from a holistic perspective, critically, independently and creatively identify, formulate and deal with complex issues, an ability to create, analyze and critically evaluate different technical solutions. ability to plan and, using appropriate methods, carry out advanced tasks within specified parameters and to evaluate this work. skills required to participate in research and development work or to work independently in other advanced contexts so as to contribute to the development of knowledge.ability to critically and systematically integrate knowledge, ability to analyze, assess and deal with complex phenomena, issues and situations, and to model, simulate, predict and evaluate events even on the basis of limited information. ability to develop, design and operate products, processes and systems taking into account people's situations and needs and society's objectives for economically, socially and ecologically sustainable development. ability to engage and contribute in teamwork and cooperation in groups of varying composition. ability to clearly present and discuss conclusions and the knowledge and arguments behind them, in dialogue with different groups, orally and in writing, in national and international contexts. **Ability to make judgments and adopt a standpoint** A Master of Science in Naval Architecture shall demonstrate: ability to make assessments in the main field of study, taking into account relevant scientific, social and ethical aspects, awareness of ethical aspects of research and development work insight into the potential and limitations of technology and science, its role in society and people's responsibility for how it is used, including social and economic aspects, as well as environmental and work environment aspects. ability to identify need for further knowledge and to take responsibility for continuously upgrading personal knowledge and capabilities.	The programme consists of a core and three optional tracks. In the core, students will develop their general knowledge and skills in ship design, marine innovation, systems engineering, and a theoretical foundation in ship hydrostatics and stability, resistance and propulsion, waves, seakeeping, maneuvering, and ship structures. By choosing one of the tracks, students will have the opportunity to develop deeper understanding and skills in Lightweight Structures, Fluid Dynamics, and Management. There is also room for elective courses, where students will have ample opportunity to broaden their education or specialise in small craft, underwater technology or in other areas suitable for individual interests and career goals.	BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc program

Chalmers University of Technology	MPNAV - NAVAL ARCHITECTURE AND OCEAN ENGINEERING, MSC PROGR	The aim of the programme in Naval Architecture and Ocean Engineering is to offer an internationally attractive and competitive education within planning, design and analysis of large structures from strength, hydrodynamic and systems engineering point of view. The focus during the programme will be on ships and offshore structures, but the aim is also to make the education attractive for students with a general interest in strength analysis, hydrodynamic analysis and systems engineering. The aim of the Masters programme in Naval Architecture and Ocean engineering is also to extend the knowledge and understanding associated with a Bachelors degree. The education provides an opportunity for originality in developing and/or applying ideas, often within a research context. Another aim of the programme is to give insight to the scientific foundation and proven experience in Naval Architecture as well as insight to current research and development work.	The programme in Naval Architecture and Ocean Engineering aims to prepare the student for independent work as a Naval Architect on a level that follows the degree requirements for the master level according to the Dublin descriptors and the Swedish Degree Ordinance for the Civilingenjör degree. The main learning outcomes are: *Knowledge and understanding:* Graduated students should be able to: General 1. demonstrate a broad knowledge within Naval Architecture including mathematics and science 2. demonstrate a significantly deepened knowledge within hydrodynamics, ship structures and systems engineering 3. design hulls with respect to hydrodynamic requirements 4. use modern computer software in all stages of the design process 5. demonstrate the ability to plan and design a complex product like a commercial ship 6. demonstrate the ability to use systems engineering tools 7. propose new concepts and designs to meet transport needs and limitations for ships 8. propose a general arrangement of an engine room for a commercial ship 9. choose engine for the ship 10. carry out global and local strength analyses with respect to static and fatigue strength 11. choose the appropriate propulsion equipment 12. select material for the hull structure and the super-structure *Skills and abilities:* Graduated students should be able to: 13. demonstrate the ability to participate and contribute to a design process as a member of a team 14. demonstrate the abilities to critically, independently and to creatively identify, formulate and solve complex problems, analyze and critically evaluate technical solutions as well as participate in research and development work and thereby contribute to the knowledge development 15. demonstrate the abilities to critically and systematically integrate knowledge and to model, simulate, predict and evaluate behaviour and events, also with limited or incomplete information 16. demonstrate the abilities to plan and with suitable methods carry out qualified tasks within given constraints 17. demonstrate the abilities to design and develop a ship with consideration of human needs and the society¿s goals for sustainable development 18. demonstrate the abilities to communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously, and in national as well as international contexts 19. can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to Naval Architecture *Formulation of judgements and attitudes:* Graduated students should be able to: 20. demonstrate the ability to formulate judgements that include reflecting on scientific, social and ethical responsibilities and to demonstrate awareness of ethical aspects on research and development work 21. demonstrate insight into the possibilities and limitations of technology, its role in society and the responsibility of humans for its use, including, social, economic and environmental aspects 22. demonstrate insight and ability to work in teams and collaborate in groups with different compositions	Ship geometry and hydrostatics, Marine Transport Systems, Ship resistance and Computational Hydrodynamics, Marine Propulsion Systems, Ship Motions and Wave Induced Loads, Marine Structural Engineering, Marine Design Project, Reliability Analysis of Marine Structures	BSc degree in Mechanical Engineering, Civil Engineering, Naval Architecture, Aerospace Engineering, or Engineering Mathematics.	M.Sc program

Chalmers University of Technology	Maritime Management	The aim is to provide officers and shore-based personnel in the shipping cluster an opportunity to further train themselves to become the next generation of leaders within ship management, strategic management and/or enable them to participate in research education and research projects. Graduates from the program can apply for higher management positions at companies in the shipping industry within the fields of ship management and strategic management with the natural possibility for promotion. Graduates also have sufficient knowledge and the formal qualification to apply for research studies in these areas	1. Identify, formulate and solve complex problems in a critical, independent and creative manner, participating in research and knowledge development 2. Design, analyse and evaluate Management solutions 3. Plan and with suitable methods carry out qualified tasks within given time constraints 4. Integrate knowledge and model, simulate, predict and evaluate cases also with limited or incomplete information 5. Design and develop processes and systems based upon society¿s goal on economical, social and sustainable development 6. Work collaboratively in groups with different compositions 7. Communicate results, conclusions and underpinning rationale, in written and oral form, in form of account and debate, also in international contexts 8. Formulate judgements including reflecting on scientific, social and ethical responsibilities and show awareness on the ethical aspects of research and development 9. Show insight on possibilities and limitations of a technology and the social, economical and ecological responsibilities of its use 10. Identify the need to update the own knowledge and develop the own competence	A B.Sc and for applicants without a major in Nautical Science or Marine Engineering there is an additional prerequisite of studies in Maritime law or Transport economics or the equivalent. Preferable course experience: Professional experience relevant to the Maritime industry	M.Sc program

DTU/Chalmers/KTH/Aalto/NTNU	NMME - Nordic Master programme in Maritime Engineering	The Master program in Maritime Engineering is concentrated on ships, including small craft, yachts and offshore structures, their design, construction and operation and their interaction with the environment. You learn to apply rational methods within mathematics, numeric analyses, fluid mechanics and structural mechanics to analyze, design and technically operate ships and offshore structures. Moreover, you will understand the special, high demands to these structures for instance with respect to safety and consideration for the environment.		The programme is structured in two parts: In the first year, you learn topics of maritime engineering, naval architecture and offshore engineering on Master level: stability, resistance and propulsion, seakeeping, manoeuvring and ship and ocean structures. If you did not have naval architecture as part of your bachelors' programme, you will also have basic introductory courses in naval architecture. In addition to maritime engineering courses, you must do courses on general and special engineering competences, such as CFD, structural analysis, composite materials etc. The emphasis on each subject will depend on the entrance university and your entrance qualifications. In particular Aalto but also NTNU offer elective courses in Arctic maritime engineering as part of the curricula. In the second year, you specialize in one of the five subjects: ocean structures, passenger ships, ship design, ship operations and small craft. Each of the subjects defines a study track.	BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc program

Centrum för flexibelt lärande, Södehamns kommun	YH – Vindkrafts-tekniker offshore	Utbildningen ger yrkeskompetens för att arbeta som installations-, drift- eller servicetekniker på land- eller havsbaserade vindkraftverk. I utbildningen ingår arbetsmiljö och säkerhetsutbildningar som exempelvis höghöjdsarbete och heta arbeten. Efter avslutade studier får du en Kvalificerad Yrkeshögskoleexamen.		Vindkraftstekniker — offshore är en yrkeshögskoleutbildning för dig som ser möjligheterna i den expansiva och viktiga branschen för långsiktigt miljövänlig energiproduktion. Utbildningen ger yrkeskompetens som efterfrågas vid både byggande och installation samt drift, service och underhåll av vindkraftverk. Den ger även en unik kompetens med koppling till offshoreplacerade vindkraftsparker. Kompetensen ger även möjlighet att söka arbete i liknande yrkesroller utanför vindkraftsektorn. Utvecklingen av utbildningen och innehållet har skett i nära samarbete med vindkraftbranschen. Det garanterar att innehållet är det rätta och att din yrkeskompetens kommer att vara eftertraktad på arbetsmarknaden.	Grundläggande behörighet enligt förordning (2009:130) om yrkeshögskolan (läs mer på www.yhmyndigheten .se). Särskild behörighet: - Elektronik grund, Ellära B och 3 fas Växelström eller - Matematik B och Fysik A Samtliga med minst betyg G. Observera att sökande även kan behörighetsförklaras utifrån kunskaper från annan utbildning eller arbetslivserfarenhet.	HVE program

Högskole-centrum Bohuslän	Maritime Sustainability Coordinator (YH)	Yrkesrollen Maritime Sustainability Coordinator är en ”hållbarhetskoordinator”, som innehar den spetskompetens som krävs för att hantera de allt viktigare globala utmaningarna kring miljö, energi och transport, på ett för företaget affärsmässigt sätt. I din yrkesroll fokuserar du på att skapa lönsamhet genom att koppla ihop sjöfart, samverkande transportslag och totallogistik med miljö- och energieffektivisering.	Företagsekonomi & logistik. Maritima affärsmodeller. Maritima branschens villkor. Maritima regelverk och direktiv. Maritime economics. Maritime Sustainability. Maritime Sustainability Management. LIA Integrerade affärsmodeller längs transportkedjan. LIA Maritime Sustainability Management	Grundläggande behörighet. Yrkeserfarenhet, minst 2 år inom ett/flera områden inom hamn/kombiterminalhantering, intermodala lösningar, logistik/transport, maritima näringar, miljö- och kvalitetsarbete eller Högskoleutbildning, lägst 180 hp inriktade på ett/flera områden inom ekonomi, energi, hållbarhet, logistik, miljö, sjöfart, teknik/naturvetenskap.	HVE program
Lernia Trohättan	Mekanik-konstruktör inom offshore	Efter examen kommer du kunna arbeta som mekanikkonstruktör inom offshore/mechanical designer for oil and gas. Efter utbildningen kommer du ha färdigheter i bland annat att; konstruera i 3D, framställa ritningar för offshore, göra hållfasthetsberäkningar, välja lämpliga material, produktionsmetoder och sammanfogningsmetoder inom offshore. Utbildningen ger dig en eftertraktad spetskompetens som är mycket eftersökt hos de multinationella företaget som konstruerar komponenter för de extrema miljöer som olje och gasutvinningen innebär..	Efter examen kommer du kunna arbeta som mekanikkonstruktör inom offshore/mechanical designer for oil and gas. Efter utbildningen kommer du ha färdigheter i bland annat att; konstruera i 3D, framställa ritningar för offshore, göra hållfasthetsberäkningar, välja lämpliga material, produktionsmetoder och sammanfogningsmetoder inom offshore. Utbildningen ger dig en eftertraktad spetskompetens som är mycket eftersökt hos de multinationella företaget som konstruerar komponenter för de extrema miljöer som olje och gasutvinningen innebär. Du utbildas direkt mot företagens rekryteringsbehov och en stor del av utbildningen sker direkt på företagen.	Godkända betyg i följande kurser (Nya VUX-kurserna, från 2012-07-01, inom parentes): Matematik A-D (Matematik 1-4) Hållfa A Maskinte A Materialkä A K (Konstruktion 1 och 2) E 6)	HVE program

7.2 COURSES

University / educator	Program name	Aim	Learning objectives	Contents	Given within a program	Prerequisites	Type of course
KTH Royal Institute of Technology	SD2705 High-Speed Craft	This course aims at giving an understanding of the design process for high-speed craft such as search and rescue craft, patrol craft, race boats, and offshore supply vessels.	Deepen your general knowledge and skills in mechanical engineering and engineering design, - develop your engineering communication skills and engineering judgement, and - make you prepared to meet some of the challenges involved in high-speed craft design. You will learn about and implement methods for hydrodynamic and structure analysis and apply these methods when designing a particular high-speed craft. The objective is that you after finishing the course should be able to: (Knowledge and understanding) 1. demonstrate broad knowledge and understanding of the scientific basis and proven experience of high-speed craft design, deeper methodological knowledge, and insight into current research and development work; (Skills and abilities) 2. demonstrate an ability, from a holistic perspective, to critically, independently and creatively a) formulate and analyse design requirements for high-speed craft, b) identify and formulate the related design challenges, c) create, analyse and evaluate different solutions for the hull structure and other parts of high-speed craft, using appropriate methods and taking into account people's situations and needs and the society's objectives for economically, socially and ecologically sustainable development; 3. demonstrate an ability to engage in teamwork and cooperation in groups of varying composition; 4. demonstrate an ability to clearly present and discuss high-speed craft design aspects with reference to relevant theory and with use of appropriate terminology, orally as well as in writing in dialogue with different groups; (Judgement and approach) 5. demonstrate an ability to evaluate high-speed craft concerning technical efficiency, and related social and economic aspects, as well as environmental and work environmental aspects	The course is problem based, where you develop your knowledge and skills by working with hydrodynamic analysis, hull structural design, and system evaluation, for a particular high-speed craft. The design work is supported by a number of seminars.	Maritime Engineering, and Naval Architecture	BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc or B.Sc
KTH Royal Institute of Technology	SD2709 Underwater Technology	The course aims at giving basic understanding, knowledge and skills in design and operation of underwater vessels (UV). The course will treat basic conditions, performance issues, subsystems and integrated systems of both small and large vessels.		The course is problem based, where you develop towards the learning objectives by working with requirements, design, analysis, synthesis, and system evaluation for a particular underwater system. The design work is supported by a number of seminars.		BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc or B.Sc

KTH Royal Institute of Technology	SD2708 Hull Structure Design	This is a course on design of large complex structures. The main focus is on ship hull structures, but the basic principles and methods are valid for arbitrary structures such as offshore structures, bridges and buildings.	Explain the principal layout of a hull structure and the function of the different structure elements, explain what loads a ship structure is subjected to and how these loads are predicted in design, explain how global and local strength (for the whole hull girder and the local structure respectively), stiffness, buckling and fatigue is treated in the design process, apply your knowledge in structure mechanics and technical beam theory from earlier courses in the analysis of global as well as local strength and stiffness, apply finite element methods in direct calculations of local hull strength, explain the purpose and structure of classification society rules, design of a ship hull according to class rules based on rule requirements and direct calculations, make a preliminary estimation of the hull structure weight, discuss hull structural design aspect by using correct terminology, present technical work in writing, in line with standard requirements on content, disposition and language.	Lectures on principal layout of a hull structure, the function of the different structure elements, hull loads, and classification rules. Application of beam theory, plate theory and finite element methods in the analysis of ship structures. Project where each student design the structure for a certain ship	Maritime Engineering, and Naval Architecture	BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc or B.Sc
KTH Royal Institute of Technology	SD2703 Marine dynamics	This course gives you the opportunity to apply and deepen your knowledge in mechanics, hydromechanics, and mathematics from previous courses, in the study of water waves, ship motions in waves, and ship manouvring.	Explain how the dimensions, geometry and mass distribution of a ship influences its seakeeping and manoeuvrability characteristics, experimentally evaluate a ships roll characteristics and manoeuvrability, model water waves, hydrodynamically as well as probabilistically, formulate and solve linear and non-linear equations of motions for a ship in a seaway and for manoeuvres in calm water, use the equations of motions to analyse a ships course stability and manoeuvrability, use the equations of motions and probabilistic wave theory to evaluate a ships seakeeping characteristics and operability in a seaway, present technical work in writing, in line with standard requirements on content, disposition and language.	Experimental evaluation of a roll motion, course stability, and manoeuvrability in full scale during a visit on board a ship. Hydromechanic and probabilistic modelling of water waves. Analytical and numerical analysis of ships motions, seakeeping and manoeuvring. Project where each student evaluate and improve the seakeeping and manoeuvring characteristics for a certain ship.	Maritime Engineering, and Naval Architecture	BSc degree in Naval Architecture, Vehicle Engineering, Mechanical Engineering or similar.	M.Sc or B.Sc
KTH Royal Institute of Technology	SD2413 Fibre Composites - Analysis and Design	The course aims to give the student theoretical and practical knowledge of composite materials. The main part of the course deals with theoretical principles which are then put into practice in homework, a design assignment and a computer exercise.	Explain the mechanical behaviour of anisotropic materials and how they differ from classical construction materials. Apply classical lamination theory to analyse the stiffness and strength of composite laminates. Design a composite laminate with given requirements. Be able to make calculations and estimates on the stiffness and strength of composite plates. Be familiar with methods for more advanced tools of composites analysis and design including failure theories and their implementation, the effect of holes and cracks, fatigue, and models for the prediction of compressive failure mechanisms. Describe potential problems and ways to analyse composite structures with FEM. To formulate and solve a composites design problem and communicate the results in a written report.	Micromechanics, classical lamination theory, failure criteria including problem solving and a programming assignment based on these theories. The course continues with anisotropic plates, advanced methods for fatigue and fracture analysis and an overview of testing methods. Finite element modelling of composites is also covered. Compulsory elements of the course include, besides a written exam, a programming and design problem.	Aerospace Engineering, Maritime Engineering, and Naval Architecture	BSc degree in engineering	M.Sc or B.Sc

KTH Royal Institute of Technology	SD2414 Fibre Composites - Materials and Manufacturing	The course aims to provide basic insight required to successfully design polymer composites.	Pick a suitable material concept and manufacturing method for a given composite product. The choices should take mechanical properties, environmental and economical aspects into account. determine a strategy for quality assurance. predict the mechanical properties of a composite laminate. based on the micro structure of the material describe how the properties of a composite material changes with temperature. perform and analyse mechanical tests of composite materials and explain differnces between theory and practice. pin-point governing manufacturing process parameters and describe how they affect the quality and characteristics of the composite material.	Introduction and applications, constituent materials, properties, micromechanics, manufacturing techniques, modelling of manufacturing, machining, joining, repair, destructive and non-destructive testing, recycling, and health and safety. Compulsory elements include a project assignment, attendance at presentations of project assignments and a laboratory assignment.	Aerospace Engineering, and Naval Architecture	BSc degree in engineering	M.Sc or B.Sc
Chalmers Professional Education	Grundläggande säkerhet för vindkraftsteknik er	Att ge deltagaren grundläggande kunskaper och färdigheter om livräddningsutrustning till sjöss, transport av personal och gods till och från anläggningar till havs, man över bord och hypotermi. Efter genomgången kurs skall deltagaren kunna vidta nödvändiga och lämpliga åtgärder för transporter till sjöss och till och från offshore-anläggningar.		Kort introduktion i sjölagstiftning, IMO, SOLAS, MARPOL, SAR - samlingsstationer och alarmsignaler, utrymning och evakuering -principer för överlevnad i vatten, behandling av köld och hypotermi -personlig skyddsutrustning, användning av överlevnadsdräkt, flytväst, livflotte och livbojar -kontakta räddningstjänst, VHF, SART, EPIRB - båttransfer av personal och gods inkl bordningsövning -räddning av man över bord -användning av pyroteknik -kursen bygger på STCW A.VI/.2, A-V/1.1			On demand
Chalmers Professional Education	Dynamisk positioneringsk urs (DP) Basic	I kursen introduceras deltagaren i Dynamisk Positionering både praktiskt och teoretiskt. Kursmomenten inkluderar bl.a. introduktion, DP-system och funktioner, referenssystem, manövrering samt DP-operationer		Full introduktion till DP-systemet och dess användning.		Lägst behörighet sjökapten klass VII, samt studieintyg för sjökaptensstu derande.	On demand

Chalmers Professional Education	Dynamisk positioneringskurs (DP) Advance	DP Simulator är vår advance-kurs, kursen fokuserar mer på simulerade DP-operationer samt olika typer av fel som kan uppstå för operatören. Dessutom analyseras olika utvalda olyckor och tillbud som inträffat för en ökad förståelse för systemet och som operatör.		Refresh på olika DP-funktioner. Praktisk operation av DP-systemet. Mer tydligt fokus på olika DP-operationer, DP-alarm, varningar, samt nödprocedurer.		DP Basic/Induction kurs samt minst 30 dagar godkänd familiarisation ombord på ett DP-fartyg. Behörighet lägst sjökapten klass VII.	On demand
Chalmers University of Technology	SJO785 - Avancerade fartygsoperationer	Ge studenten en introduktion till avancerade fartygsoperationer inom framförallt offshoreindustrin.	Beskriva och förstå olika olika typer av offshore-operationer. Beskriva de regelverk och guidelines som offshore-branschen omfattas av. Förstå DP's betydelse i offshore-industrin, samt även ha grundläggande kunskaper i hantering av systemet. Beskriva och förstå olika typer av fartygsmodeller samt framdrivningssystem. Beskriva och definiera begreppet säkra operationer. Använda olika typer av "risk management"-metoder och beskriva hur man bemöter risker inom offshore. Ha förståelse för arktiska offshore-operationer. Förklara besättningens organisation och roller ombord samt förklara hur bryggarbetet genomförs. Förklara hur hårt väder och isförhållanden påverkar framförandet av fartyget.	Moment 1 - Allmän introduktion i offshorebranschen, hur den fungerar, uppbyggnad samt beskrivning av de olika fartyg som används och om olika installationer. Enklare genomgång av de regelverk som branschen omfattas av. Moment 2 - HSE (Health Safety and Environment) med fokus på Human Factors, risk management och säkra operationer i offshoreindustrin. Moment 3 - Operationer och manövrering, grundläggande DP-kunskap, användandet av olika framdrivningssystem samt planering och manövrering vid offshoreinstallationer. Moment 4 - Arktiska operationer offshore - fokus på Ice Management offshore och isnavigation Moment 5 - Framtidsfokus och arbetsmarknad.	SJÖKAPTENS PROGRAM, Årskurs 3	LNC046 Terrester navigation, SJO596 Navigationssystem A, SJO302 Navigationssystem B, LNC047 Sjömanskap A, SJO581 Sjömanskap B, SJO660 Sjömanskap C, LNC301 Manövrering och girplanering, samt minst 150 dagars fartygsförlagd utbildning vid varvad teori och praktik.	M.Sc or B.Sc

Chalmers University of Technology	Marine Structural Engineering - MMA167	The purpose of the course is to give professional knowledge of design loads, structural characteristics of marine structures (with emphasis on ship structures) and how to carry out analysis of their strength. Limit state design methodologies are taught to demonstrate how to make safe designs and analyses of lightweight stiffened shell structures that are typical of ships and offshore structures. The theory is general while the application is on ship and offshore structures. Examples of fatigue design principles are discussed continuously during the course together with some examples.	After finishing the course, the student will have professional knowledge in marine structural engineering and how to make safe designs of marine structures. The student will have professional competence to systematically solve general problems which concerns the structural integrity of structures, in particular stiffened lightweight shell structures. After completion of this course, the student should be able to:- identify and discuss which loads a marine structure is subjected to, - use and interpret classification rules in order to design lightweight structures according to given design criteria, - carry out full strength analyses (by means of limit state design criteria) of ship and offshore structures,- understand and discuss the meaning of the effective flange concept,- identify and discuss the functionality of the structural elements in a ship structure, both from a global and local perspective, - understand the functionality and suggest modifications of a ship or offshore design in order fulfil design criteria,- carry out a structure stability and buckling analysis of a stiffened thin-walled lightweight structure, and - critically evaluate and compare various design concepts with respect to material, geometry and structural aspects.	The course is divided into four parts: design rules and aspects of marine structural engineering, engineering beam theory applied on marine structure designs, the effective flange concept, and structural stability of beams and stiffened shell structures. Examples of fatigue design principles are discussed continuously during the course together with some examples. Design rules and aspects of marine structural engineering: Examples and categorization of various types of marine structure designs. Identification and categorization of loads that act on marine structures, such as wind, wave and impact loads. Study of design rules according to classification societies. Limit states designs. Engineering beam theory applied on marine structure designs: Normal stresses/strains due to axial loading conditions. Normal stresses/strains due to bending. Normal stresses/strains due to torsion. Shear stresses/strains due to bending. Shear stresses/strains due to torsion. The effective flange concept: Objective with the concept and motivation to why it must be considered. Calculations using the summation method. Calculations using the elementary case method. Structural stability of beams and stiffened shell structures: Introduction to ultimate strength analysis. Overview of methods useful for structural stability analysis. Structural stability of beam structures. Analysis of large-scale realistic stiffened shell structures with regard to their stability characteristics and progressive collapse.	Naval Architecture and Ocean Engineering	Mathematics (including mathematical statistics, numerical analysis and multi-variable calculus), mechanics and strength of materials and engineering materials.	M.Sc or B.Sc

Chalmers University of Technology	Marine Propulsion Systems - SJO740	The objective of the course is to give the students knowledge and tools designing and analyse the propulsion system of a large commercial vessel. This involves knowledge and tools in systems engineering to be used for preliminary design of general complex systems and specifically marine machinery systems. Attention is given to primary function of the systems as well as to secondary requirements and effects including reliability, economy and environmental impact. Moreover, the basic hydrodynamics properties of the propeller and propeller design principles will be covered.	After completion of this course, the student should be able to: - Understand the abstract function analysis of the machine systems relating to the requirements of ship owners and other users of the ship. - To collect information and generate concepts for arbitrary marine machinery systems. - Evaluate concepts and develop a general layout of a machinery system. - Describe and discuss the properties of the systems, document and communicate the results. - Understand and discuss the impact of the IMO emission regulations and the techniques to fulfil these requirements. - Understand the function of the propeller through principles of momentum theory. - Apply the ITTC procedures to determine propeller requirements from self propulsion tests. - To choose an appropriate propeller given necessary thrust and machinery characteristics. - Understand and discuss the effects of interaction between hull and propulsor and how this affects the propeller design.	A large part of the course is problem oriented in the sense that assignment tasks will run in parallel with lectures given on different topics. An essential part of the course is a task to make a general arrangement of an engine room for a commercial ship, starting with mission analysis, customer identification followed by functional analysis, compiling engine systems data, engine systems concept generation and evaluations and ending up with writing a project report and presenting this at a seminar. The design task will be performed in small teams. Lectures will cover Systems Engineering as well as the functions and most important features of engines, transmissions and propeller systems and will include slow speed engines, medium speed engines, gas turbines and diesel electric systems. Required propulsion power, efficiency and reliability will be analyzed as well as the environmental impact of different candidate solutions. Apart from the design task, practical parts of the course include computer simulations of engine systems, study tours to ships in the harbour for studying engine rooms, and computer simulations determining propeller characteristics.	Naval Architecture and Ocean Engineering	Mathematics (including matemathical statistics, numerical analysis and multi-variable calculus), Mechanics and strength of material and Engineering materials.	M.Sc or B.Sc

Chalmers University of Technology	Wave Loads and Seakeeping - SJO745	The aim of the course is to give an introduction to wave-induced motions in regular and irregular waves and to ship manoeuvrability in deep and restricted calm water. The course will show how to make simple estimates of the motion and manoeuvring performance by hand. It will also present the theory and give the opportunity to use modern computer software for prediction of motion in waves and a manoeuvring simulator for investigation of manoeuvring properties.	After completion of this course, the student should be able to: - show the ability to describe regular and irregular waves in the frequency domain - show the ability to handle irregular waves from a statistical and probabilistic point of view - show the ability to make simple estimates of wave induced loads on floating structures - show the ability to make simple estimates of motions in waves - show knowledge about derived responses in waves - show the ability to estimate the probability of the derived responses - show knowledge about extreme motion response in waves - show the ability to use a modern computer software for ship motion analysis - show knowledge on methods for ship manoeuvring analysis - show knowledge about how to assess the course stability of a ship - show knowledge how to analyze common ship manoeuvres - show knowledge about background theory and simplifications for practical applications - show knowledge of steering devices - show knowledge about numerical solution methods for manoeuvring - show knowledge about basic design principles	- Waves, wave spectra, regular and irregular waves, wave statistics, probability - Forces due to wave loads - Equations of motion for a floating structure - The seakeeping problem - Equations and approximations for seakeeping - Response due to wave loads in heave, pitch and roll for regular and irregular waves - Frequency domain analysis - Derived responses, velocities, accelerations, propeller emergence – Slamming - Parametric roll - The manoeuvring problem - Equations and approximations for manoeuvring - Course stability - Manoeuvring in deep and restricted water - Propeller, rudders and thrusters for manoeuvring	Naval Architecture and Ocean Engineering	Mathematics(including mathematical statistics, numerical analysis and multivariable calculus), Mechanics and Strength of materials.	M.Sc or B.Sc
Chalmers University of Technology	Reliability Analysis of Marine Structures - SJO750	The course gives the student knowledge and tools how to design marine structures with regard to limit state based approaches by means of probability and risk analysis approaches. A variety of simplistic and advanced methodologies are compared with objective to demonstrate their advantages and limitations. Realistic and typical examples for marine structures are used throughout the course in order to introduce the student to real examples with their challenges of complexity which require solid and well-motivated assumptions.	After finishing the course, the student will have good knowledge and understanding how a reliability analysis of a marine structure should be carried out. After completion of this course, the student should be able to: use and interpret classification rules in order to design marine structures according to given design criteria and safety measures, carry out a reliability analysis of a part of a ship or an offshore structure, demonstrate which is the most appropriate methodology to use in a reliability analysis of an arbitrary part of a marine structure, understand and discuss the advantages and limitations using a FORM, SORM or other simulation method for probabilistic analysis, critically evaluate and compare various design concepts with respect to reliability and safety measures.	It is well recognised that limit state based approaches for marine structures are much better methodologies for structural design and strength assessment than traditional working stress based approaches, the latter typically being formulated as a fraction of material such as yield strength. This is the situation because it is not possible to determine the true margin of structural safety as long as limit states remain unknown. A limit state is defined as a condition under which a particular structural component or an entire structural system fails to perform its designated function. Four types of limit states are relevant: serviceability limit state (SLS), ultimate limit state (ULS), fatigue limit state (FLS) and accidental limit state (ALS). The ULS for ships and offshore structures include the failure of critical components of the structure caused by exceeding the ultimate strength (in some cases	Naval Architecture and Ocean Engineering	Mathematics (including mathematical statistics, numerical analysis and multi-variable calculus), mechanics and strength of materials and engineering materials	M.Sc or B.Sc

		reduced by repetitive actions) by any combination of buckling, yielding, rupture or fracture, or the transformation of the structure into a mechanism associated with buckling collapse or excessive deformation. ULS typically occur under extreme actions or action effects. The course is divided into four parts as follows: Introduction to limit state approaches: Definition of limit states: definitions and stochastic variables. Application of limit states in the design of marine structures: design criteria according to classification rules. Statistics theory: Statistical distributions. Methods for uncertainty analysis. Probabilistic methods: First order reliability methods (FORM). Second order reliability methods (SORM). Simulation methods (Monte Carlo). Reliability and risk analysis in limit states design. Three mandatory computer assignments will be carried out where the student will practice gained knowledge during the course on realistic and typical examples for marine structures. Reports for each assignment should be handed in and one of the reports has to be presented on a seminar.

Chalmers University of Technology	Marine Design Project - MMA150	The purpose is to let the students participate in a real problem oriented ship, offshore or yacht design project.	apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to Naval Architecture - demonstrate the ability to participate and contribute to a design process as a member of a team - demonstrate the ability to follow a systems engineering approach - demonstrate the ability to plan and design a complex product like a commercial ship/offshore structure or yacht - propose new concepts and designs to meet customer requests, transport needs and limitations	Student teams will be assigned real design problems, guided by professional engineers from industry and faculty members from Chalmers. The initial design process prior to an order of a new ship, offshore plant or yacht is covered during the project following the demands of the customer.	Naval Architecture and Ocean Engineering	Mathematics (including mathematical statistics, numerical analysis and multi-variable calculus), Mechanics and strength of materials, Engineering materials, Fluid mechanics. Additional course requirements : MMA136 - Ship geometry and hydrostatics, MMA161 - Ship resistance and computational hydrodynamics, SJO740 - Marine propulsion systems, SJO745 - Wave loads and seakeeping and MMA167 - Marine Structural engineering.	M.Sc or B.Sc

Chalmers University of Technology	Quality Management	Målet med kursen är att hjälpa studenter att förvärva kunskap om olika initiativ för ökad kvalitet och att bättre förstå ämnet kvalitets- och verksamhetsutveckling. Kursen syftar också till att hjälpa studenterna att utveckla praktiska förmågor med syfte att kunna facilitera organisatoriska förbättringsinitiativ.	MPMAR mfl	M.Sc or B.Sc
Chalmers University of Technology	Risk Management and Safety	Målet med hållbar utveckling inom industrin bör vara: 1) Att uppnå säkra produkter och se till så att dessa kan användas på ett säkert sätt samt att produktionen av dessa också kan ske på ett säkert sätt. 2) Att se till människors hälsa och välbefinnande. 3) Att skydda miljön, samt 4) Att världens ekosystem används inom acceptabla förhållanden med avseende på material, energi och befolkning. Därför säkerhet är en viktig del av en hållbar utveckling. Faktum är att säkerhet är effektivitet och ger vinster på kort och lång sikt. Målet med kursen är att ge studenterna en förståelse för principerna för analys- och begreppsbildning samt träning i att tillämpa sin förmåga att förbättra människors säkerhet, till att skydda miljön och för att förbättra processernas och systemens kvalitet och produktivitet. Dessutom ska de kunna bedöma risker och tillförlitlighet samt risker till följd av osäkerhet med hjälp av särskilda programvaror	MPMAR mfl	M.Sc or B.Sc

Chalmers University of Technology	Maritime enivornment and Environmenatl management	Kursen syftar till att inspirera och stimulera studenten till att reflektera över hur hon eller han kan bidra till en hållbar utveckling. Kursen ska möjliggöra att studenten kan agera som förändringsagent i sitt framtida arbete, vare sig om det är inom ett företag, myndighet, organisation, eller som forskare. För att möta detta syfte kommer kursen ge grundläggande förståelse för uttrycket "hållbar utveckling", såväl som kunskap om användandet av fysiska resurser och ekosystemtjänster. Kursen belyser relationen mellan sjöfart och miljön. Den grundläggande förståelsen för miljöproblem relaterade till maritima aktiviteter, såsom utsläpp till hav och luft, samt andra hållbarhetsproblem relaterat till transportaktiviteter kommer presenteras och dessa lägger vikt om hur sjöfartens miljöpåverkan kan minskas. Kursen ska främja ett personligt engagemang gentemot hållbarhetsfrågor och ge studenten den kunskap och de verktyg som krävs för att hantera komplexa hållbarhetsproblem i sin framtida karriär.	MPMAR	M.Sc or B.Sc
Chalmers University of Technology	Maritime energy management	1) Att förbereda studenter för en yrkesroll relaterad till energieffektivisering inom sjöfarten. 2) Att skapa intresse för vidare forskarstudier inom ett dynamiskt och samhällsrelevant område	MPMAR	M.Sc or B.Sc

Linnaeus University	Basic Safety	Kursen ges i enlighet med STCW A-VI/1.2 och skall ge de kunskaper som behövs för att kunna tilldelas uppgifter inom ett fartygs säkerhetsorganisation. Basic Safety innehåller följande fyra delar: - Överlevnadsteknik vid övergivande av fartyg - Brandskydd - Första hjälpen - Personlig säkerhet och socialt ansvar	Den studerande skall efter avslutad kurs: ha kunskaper om fartygets livräddningsutrustning ha kunskaper om brand och brandbekämpning ha kunskap om säkerhet och marint miljöskydd ha kunskaper om ”första hjälpen	**BS Grundläggande Säkerhetskurs (Basic Safety)** BS A Livräddningsutrustning och överlevnad Säkerhetsplaner – livbåts- och brandfördelning Övningar med säkerhetsutrustning Olika typer av livräddnings-utrustning ombord Åtgärder, förberedelser och risker i samband med övergivandet av fartyg Epirb och Sart, praktiskt handhavande Praktiska övningar med livräddningsutrustning **BS B Brandskydd och brandbekämpning** Brand, brandorsaker och brandspridning ombord Släckmedel, fast och portabel brandbekämpningsutrustning samt personlig brandskyddsutrustning Brandskyddsorganisation och brandövningar Praktiska brandskyddsövningar med portabel utrustning **BS C Miljö och säkerhet** Arbetsmiljö ombord, allmänt om risker för olycksfall och förebyggande åtgärder Allmänt om skyddsorganisationen ombord Allmänt om personlig skyddsutrustning, inklusive sådan ombord Grundläggande om regler till skydd för marina miljön **BS D Hälso- och sjukvård** Allmänt om sjukvården och dess organisation ombord ABC-sjukvård, omhändertagande av skadad person, hjärt- lungräddning, enklare förband Transport av skadade Allmänt om vaccinationer för sjöpersonal	Vecka 15 och Vecka 45	On demand

Linnaeus University	DP: Dynamic Positioning, Basic	I kursen introduceras Dynamisk Positionering (DP) både teoretiskt och praktiskt. Teoretiska block följs upp direkt med praktiska prov och demonstrationer i DP-simulatorn. Kursmoment som gås igenom inkluderar bl a Introduktion till DP, DP-funktioner, Positioneringssytem, Bryggtjänst med DP.		Vecka: 37, 40, 43, 48, 4, 7, 12, och 21		On demand
Linnaeus University	DP: Dynamic Positioning, Advanced		Kursen startar med en kort refresher om DP-funktioner och som följs av ett flertal CASE studies där kursdeltagarna själva får planera och utföra DP-operationer i DP-simulatorn. Utvalda olyckor och tillbud granskas	Vecka: 46, 50, 14 och 19	Dynamic Positioning, Induction, minst 30 dagars praktik på DP-fartyg samt behörighet lägst klass VII.	On demand
Linnaeus University	GOC General Operators' Certificate	Kursen avser att ge kursdeltagare kunskap om GMDSS, samt att ge säkerhets- och annan trafik med radiotelefoni, radiotelex och satellit på svenska och engelska. Kursen uppfyller STCW-kraven för General Operators' Certificate. I examinationen ingår såväl praktiska som teoretiska moment.			Målgrupp: Fartygsbefäl som tjänstgör ombord på fartyg som trafikerar GMDSS-område A2-A4. Goda kunskaper i engelska samt viss datorvana krävs.	On demand
Linnaeus University	GOC refresher	Kursen avser att ge kursdeltagare kunskap om GMDSS samt säkerhets- och annan trafik med radiotelefoni, radiotelex och satellit på svenska och engelska. Kursen uppfyller STCW-kraven för General Operators Certificate. I examinationen ingår såväl praktiska som teoretiska moment. .			Goda kunskaper i engelska krävs	On demand

Linnaeus University	Isnavigering	Kursen avser att ge kursdeltagare kunskap om isnavigering utan isbrytarassistans samt med hjälp av isbryttare	Navigering utan isbrytarassistans • Drivande isfält/isberg • Lämpligt ställe att gå in i ett isfält • Områden som bör undvikas • Tillvägagångssätt vid inträde i isfält • Vad att göra om man fastnar i isen • Vad man absolut inte ska göra om man fastnar i isen • Olika metoder att komma loss om man fastnar i isen • Ispress • Vallar, rännor, råkar och gamla rännor • Kajgång i isbelagda hamnar Avgång från kaj i isbelagda hamnar Navigering med hjälp av isbrytare • Standardrutiner i is-konvojer • Kommunikationer • Breda fartyg och smala rännor • Skarpa krökar • Avstånd mellan fartyg i konvojer • Stor uppmärksamhet vid konvojnavigering • Hur man stoppar (snabbt) i konvojer	Enligt överenskommelse		On demand
Rope Access Sverige AB	IRATA-kurs nivå 1	Första steget inom IRATA och instegskurs för dem som vill inleda en karriär inom industriell klättring på land och på installationer till havs.	Riggning, knutar, Säkert arbete och användning av utrustning, Olika typer av repmanövrar, Teknisk klättring, Enkla räddningar, Bakgrund och teori, Lagar och normer			On demand
Rope Access Sverige AB	IRATA-kurs nivå 2	Mellanstegsnivå inom industriell klättring. Innan påbörjad kurs skall man ha 1000 timmars loggförd tid samt minst ett år som certifierad IRATA nivå 1.	Genomgång av alla nivå 1 – metoder, Räddning från repklämmor, Hissning och nedsänkning av nödställd, Introduktion till avancerade räddningar, Nivå 2 teori, Val av utrustning, inspektion, skötsel och underhåll, Lagar och normer		minst 1000 loggförda timmar och minst ett år som nivå 1	On demand

Rope Access Sverige AB	IRATA-kurs nivå 3	IRATA nivå 3 är den internationella erkända nivån för arbetsledning inom industriellt reparbete på land och till havs. Innan påbörjad kurs skall man ha 2000 timmars loggförd tid samt minst ett år som certifierad IRATA L2.		Säkerställande av färdigheter inom nivå 1 och nivå 2 metoder, Riskbedömning, Avancerade räddningar, Avancerade riggningsmetoder, Arbetsledning och ansvar, Inspektion och skötsel av utrustning, Lagar och normer		minst 2000 loggförda timmar och minst ett år som nivå 2 samt giltigt försthjälpenin tyg (ex. via Rödakorset)	On demand
Rope Access Sverige AB	GWO-kurs	Rope Access Sverige är först i Sverige att bli certifierad för att hålla i vindkraftutbildning enligt Global Wind Organisation, GWO. När några av världens största energibolag gick samman för att hitta en gemensam kompetensnivå på sin Basic Safety Training så var vi snabbt igång för att möta dessa nya krav.	visa ett säkert och korrekt agerande vid brand, kunna användabrandsläckare och brandfilt på ett korrekt sätt. förstå behovet av korrekt teknik vid manuell hantering/ergonomi. kunna analysera och prioritera en olycka med hjälp av L-ABCDE samt utföra HLR. använda sin PPE på ett korrekt sätt, genomföra kamraträddning/evakueringpå ett säkert och korrekt sätt.	Manual Handling, First Aid, Fire Awareness, Working at Heights			On demand
JFK Offshore Sweden	Riggerkurs	Riggerutbildningen på 9 dagar ger personer en framtid inom offshoreindustrin som lastkopplare, riggare eller flaggman. Utbildningen ger dig möjlighet till arbete inshore/offshore i industrin.	Efter avslutad utbildning skall personen ha god insikt i: säkerhet, Fallskydd, Lyftredskap, Riggning, Radio-kommunikation, CV-skrivning för offshoreindustrin samt veta vart och hur du söka arbete inom offshoreindustrin. Personer ska även ha kännedom om olika regler kring arbeta i Norge och bo i Sverige.	Upplägget planerat enl. följande: Dag; 1, 2, 3 Teori; föreläsning kring de 3 olika modulerna; lyft- och fallsäkring samt riggning. Dag; 4, 5, 6 Praktik blandat med teori Dag; 7 Teori samt praktiskt prov Dag 8 VHF prov, CV, Arbetslänkar samt reglerverket i Norge/Sverige Dag 9 Teoriprov och avslutning	Löpande		On demand
JFK Offshore Sweden	Fallsäkring	Fallsäkringen är en 8 timmars utbildning och vänder sig främst till hantverksarbetare så som byggnadsarbetare, elektriker, vvs mm som ska arbeta i höjden i Norge. Fallsäkring är ett krav från Norge för att få arbeta på en höjd över två meter.		Utbildningen handlar till största del om teori. Genomgång av personlig skyddsutrustning. När sker fallolyckor? När ska fallsäkringsutrustning användas? Förankringspunkter Riktig användning av fallsäkringsselar Egen och andras kontroll av utrustningen Dokumentation Underhåll och förvaring Kasseringsregler	Löpande		On demand

Offshore-supporten	Grundkurs grundläggande säkerhet	Att ge eleven grundläggande kunskaper och färdigheter inom första hjälpen, brandbekämpning, helikoptertransporter med helikopterevakuering, sjösäkerhet, samt personlig säkerhet som är nödvändigt för en vistelse ombord på en offshoreinstallation.	Efter genomgången kurs skall kursdeltagaren: Första Hjälpen: - Uppnå sådana färdigheter att han/hon skall kunna agera och ge första hjälpen vid olyckor och akuta sjukdomstillstånd. Brandsläckning: - Uppnå grundläggande kunskaper om förebyggande brandskydd samt grundläggande kunskaper om brandsläckning för att kunna agera vid utbruten brand. Dessutom skall kursdeltagaren få kunskap om vanligen förekommande brandsläckningsutrustningar ombord på offshoreinstallationer, användning av handbrandsläckare samt mönstringsrutiner. Helikopter och Helikopterevakuering: - Uppnå grundläggande kunskaper om säkerheten ombord vid helikoptertransporter samt nödprocedurer och användande av nödutrustning. Vidare skall eleven erhålla kunskap om rutinerna vid incheckning vid heliport. - Uppnå grundläggande kunskaper om och genomföra övningar i evakuering av helikopter, inklusive evakuering under vattnet. Sjösäkerhet - Uppnå grundläggande kunskaper om mönstringsprocedurer och övningar samt praktiskt träna med livräddningsutrustning som finns ombord på offshoreinstallationer. Personlig Säkerhet - Få förståelse för de allmänna säkerhetsförhållanden som råder ombord på offshoreinstallationer. Dessutom skall kursdeltagaren få kunskap om den personliga skyddsutrustningen samt lära sig att använda den på rätt sätt.	Kursen genomförs i enlighet med den överenskommelse som finns mellan Nordsjöländerna om grundläggande säkerhet för offshore. Avtalet är träffat mellan Holland, Storbritannien, Norge och Danmark (NSOC-D).			On demand
Offshore-supporten	GWO CERTIFIKATSUTBILDNING	Global Wind Organisation (GWO) har utvecklat standarden ”Basic Safety Training” för utbildning vid höghöjdsarbete inom vindkraftsindustrin. Denna standard ska uppfylla behovet av grundläggande säkerhetsutbildning.		Första hjälpen (First aid). Ergonomi (Manual handling). Brandkunskap (Fire awareness). Arbete på hög höjd (Working at heights). Överlevnad till sjöss (Sea survival).			On demand
Gotlands Energi	Offshore vindkraft	Kursen riktar sig till dig som har gått grundkurs fallskydd och som arbetar eller skall börja arbeta med sjöbaserade vindkraftverk.	Känna till brandrisker och kunna släcka en eventuell brand. Kunna, via kunskaper från Förstahjälpen, rädda liv med hjälp av HLR: hjärt och lungräddning. L-ABC: Läge, Blödning, Cirkulation. Kunna hantera en livflotte och dess utrustning via delen Säkerhet till sjöss. Använda en överlevnadsdräkt, flytväst och pyroteknik. Handha en helikoptersele. Kunna kliva av och på ett fartyg på ett säkert sätt. Klättra i olika lejdare.	Första hjälpen. Grundläggande brandutbildning. Grundläggande säkerhet till sjöss. Praktiska övningar Dag 1: Grundläggande brand och Förstahjälpen. Dag 2: Grundläggande säkerhet till sjöss Dag 3: Praktiska övningar till sjöss		Grundkurs fallskydd	On demand
University of Gothenburg	Maritime environmental law	The overall aim of the course is to provide the student with a deeper understanding of international laws and regulations concerning the maritime environmental area especially when related to maritime operations. The student will also receive understanding of the civil and	Knowledge and understanding 1. account for PartXII in UNCLOS and the conventions which emerged after the Torrey Canyon disaster 2. account for the public law conventions which regulates the area like MARPOL, OPRC, London Dumping, Basel and Hong Kong conventions 3. account for the civil law conventions which regulates liability and compensations issues resulting from maritime operation like CLC, FUND, HNS and the bunker convention 4. explain regulations regarding salvation, forms and standard contracts such as LOF and SCOPIC		MPMAR mfl		M.Sc or B.Sc

	public law aspects related to the maritime environment.	5. account for the rules regarding towing and pilotage in those cases connected to salvage and maritime environmental law. 6. explain and account for concepts and principles within the maritime environmental area regarding exploration and exploitation of the sea's natural resources Skills and abilities 7. systematically, critically and independently identify, formulate and analyze the international sale of goods and legal issues 8. to in both national and international contexts in writing explain and discuss the conclusions drawn by accomplished tasks, and the knowledge and arguments underlying them, in dialogue with different groups Judgement and approach 9. have the capacity for independent and critical attitude towards the legal system 10. understand the international maritime and commercial law capabilities and limitations, and its role in society in a national and international perspective	