Syllabi

for

The Bachelor of
Maritime Transport and Ship Management

Post Graduate Diploma as Master Mariner

Post Graduate Diploma as Marine Chief Engineer

Post Graduate Diploma as Marine Chief Engineer and Master Mariner

(Ship's Officer Training Programme)

Version 5.80, 1 February 2021

SIMAC

Overview of syllabi:

Junior Officer

No.	Subject area	BJ1	BJ2	BJ3	BJ4	BJ5	BJ6	BJ7	BJ8
31000	workshop Training, Safety and Seamanship (BJ)	X	X						
32000	Work Experience (BJ)		X				X	X	X
33000	Interdisciplinary Elements (BJ)			X	X	X			
34000	Nautic (BJ)	X		X	X		X		X
35000	Technology (BJ)	X		X	X	X			
35001	Thermal Machinery and Systems (BJ)	X				X			
35002	Electrical and Electronic Machinery and Systems (BJ)	X			X	X			
35003	Process and Analysis and Automation (BJ)					X			
36000	Management (BJ)			X	X		X		X
3-4-8000	Elective Subjects (BJ)					X	X		
39000	Bachelor Project (BJ)								X

Senior Officer

No.	Subject area	SKF	MCH			SCH			
		SE1	SE2	SE3	SE4	SE1	SE2	SE3	SE4
43000	Dual Officer Project (SE)							X	
45000	Technology (SE)	X				X			
45001	Thermal Machinery and Systems (SE)		X	X			X	X	
45002	Electrical and Electronic Machinery and Systems including Elective Electrician Authorization) (SE)		X	X	(X)		X	X	(X)
45003	Process and Analysis and Automation (SE)		X	X			X	X	
46000	Management (SE)	X		X		X			
3-4-8000	Elective Subjects (SE)	X	X			X	X		

(X) = Elective subject – non-obligatory.

Syllabus

Subject area:	**31000**	**Workshop Training, Safety and Seamanship (BJ)**		
Subject(s):	34100	Navigation (4 ECTS)		
	34110	Navigation I	BJ1	4 ECTS
	34300	Watch Keeping (2 ECTS)		
	34310	Watch keeping Duty I	BJ1	2 ECTS
	35100	Ship Technology (5 ECTS)		
	35110	Practical Sailing	BJ1	3 ECTS
	35120	Ship Technology I	BJ1	2 ECTS
	35125	Basic Training for Oil, Chemical & Gas Tanker		
	35200	Maritime Technology (2 ECTS)		
	35210	Maintenance	BJ1	1 ECTS
	35220	Environment	BJ1	1 ECTS
	35400	Thermal Machinery and Systems I (4 ECTS)		
	35410	Thermal machinery and systems I-I	BJ1	2 ECTS
	35420	Thermal machinery and systems I-II	BJ1	2 ECTS
	35800	Electrical and Electronic Machinery and Systems I (4 ECTS)		
	35810	Electrical and electronic machinery I-I	BJ1	2 ECTS
	35820	Electrical and electronic machinery I-II	BJ2	2 ECTS
	31100	Safety Training (6 ECTS)		
	31110	Safety at Sea	BJ1	1 ECTS
	31120	Safety at Work	BJ1	1 ECTS
	31130	Safety at Work - Paragraph 17		
	31140	Elementary First Aid	BJ1	1 ECTS
	31141	Medical First Aid	BJ6	
	31161	Basic Fire Fighting Theory	BJ1	1 ECTS
	31162	Basic Fire Fighting Course		
	31171	Advanced Fire Fighting Theory	BJ6	1 ECTS
	31172	Advanced Fire Fighting Course		
	31180	Maritime Law	BJ1	1 ECTS
	31190	Designated Security Duties		

	31200	Workshop Training (18 ECTS)		
	31221	Vice Work and Technical Documentation I	BJ1	2 ECTS
	31222	Vice Work and Technical Documentation II	BJ2	2 ECTS
	31230	Welding and Material Understanding I	BJ1	1 ECTS
	31240	Welding and Material Understanding II	BJ2	3 ECTS
	31260	Lathing and Milling	BJ2	4 ECTS
	31270	Practical Work	BJ2	4 ECTS
	31280	Rigging Workshop	BJ1	2 ECTS

Admission criteria:	None for subject area Workshop Training, Safety and Seamanship (BJ).
Criteria to pass subject	These assessments make up the subject: 1. **None** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Eighteen** assessments graded Passed/Not Passed. • All assessments must be graded Passed.
Semester:	BJ1 + BJ2
ECTS credits:	30 + 15
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on certificate of proficiency tests et cetera – Danish order no 184 26 March 1999, as amended. • Order on training programme and refresh training programme for safety at sea and firefighting on board ships – Danish order no 226 of 2 March 2015, as amended. • Order on training programme for Tanker Operations – Danish order no 1165 of 2 November 2014, as amended. • Order on training programme for operation of survival craft and rescue boat other than fast rescue boats – Danish order no 1207 of 23 October 2015, as amended. • Order on training programme and refresher training programme for operation of fast rescue boats – Danish order no 658 12 May 2015, as amended. • Order on training programme in Maritime Security of Ships – Danish order no 1279 of 7 November 2013, as amended.

	• Order on training programme and refresh training programme for advanced fire-fighting on board ships – Danish order no 1466 of 8 December 2015, as amended. • Order on measures for prevention of cancer risk by working with substances and materials (§17 course) – Danish order no 1795 of 18 December 2016, as amended.
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 – Operational level *STCW Code, as amended: Part A, chapter VI - Emergency, safety, security:* Section A-VI/1, paragraph 2 • Personal survival techniques as set in table A-VI/1-1 • Fire prevention and fire-fighting as set in table A-VI/1-2 • Elementary first aid as set in table A-VI/1-3 • Personal safety and social responsibilities as set in table A-VI/1-4 Section A-VI/2, paragraph 1 to 12 • Proficiency in survival craft and rescue boats other than fast rescue boats as set in table A-VI/2-1. • Proficiency in fast rescue boats as set in table A-VI/2-2. Section A-VI/2-2, paragraph 7 to 12 • Proficiency in fast rescue boats as set in table A-VI/2-2. Section A-VI/3, paragraph 1 to 6 • Advanced fire-fighting as set in table A-VI/3 Section A-VI/4, paragraph 1 to 3 • Medical first aid as set in table A-VI/4-1 Section A-VI/6, paragraph 6 to 8 • Designated Security Duties as set in tablet A-VI/6-2 *STCW Code, as amended: Part A, chapter V - Special training requirements:* Section A-V/1-1-1 • Basic training for oil and chemical tanker as set in table A-V/1-1-1. Section A-V/1-2-1 • Basic training for gas tanker as set in table A-V/1-2-1
Certificate(s):	*Certificate of Proficiency Basic Safety Training* is issued upon completion of the training programme prescribed in Regulation VI/1 and STCW Code; section A-VI/2 of the STCW Convention of 1978, as amended. *Certificate of Proficiency in Medical First Aid* is issued upon completion of the training programme prescribed in Regulation VI/4, paragraph 1 of the STCW Convention of 1978, as amended. *Certificate of Proficiency for Designated Security Duties* is issued upon completion of the specialized training programme prescribed in Regulation VI/6, paragraph 4 to 6 of the STCW Convention of 1978, as amended and the Danish order no 1279 of 7 November 2013, as amended. *Course Certificate of Basic Training for Oil, Chemical and Gas Tanker Cargo Operations* is issued upon completion of the training programme prescribed in Regulation V/1-1, paragraph 2.2 and Regulation V/1-2, paragraph 2.2 of the STCW Convention of 1978, as amended and the Danish order no 1165 2 November 2014, as amended. (”Carry out fire-fighting operations” as set in table A-V/1-1-1 and 1-2-1 of STCW Convention of 1978, as amended)

	Course Certificate of Safety and Health Training in Welding and Thermal Cutting is issued upon completion of the training programme prescribed in the Danish order no. 1795 of 18 December 2015, as amended - (paragraph 17 training programme). *Certificate of Proficiency in Advanced Fire Fighting on board Ships* is issued upon completion of the training programme prescribed in Regulation VI/3 of the STCW Convention of 1978, as amended and the Danish order no 1466 of 8 December 2015, as amended. *Course Certificate in survival craft and rescue boat other than fast rescue boats* is issued upon completion of the training programme prescribed in Regulation VI/2, paragraph 1.3 of the STCW Convention of 1978, as amended and the Danish order no 1207 23 October 2015, as amended. *Certificate of Proficiency in survival craft and rescue boat other than fast rescue boats* is issued upon completion of at least 6 months relevant seagoing service is proved and completed the training programme prescribed in Regulation VI/2, paragraph 1 of the STCW Convention of 1978, as amended and the Danish order no 1207 23 October 2015, as amended. *Course Certificate in Fast Rescue Boats* is issued upon completion of the training programme prescribed in Regulation VI/2, paragraph 2.3 of the STCW Convention of 1978, as amended and the Danish order no 658 12 May 2015, as amended. *Certificate of Proficiency in Fast Rescue Boats* is issued when a holder of Certificate of Proficiency in survival craft and rescue boat other than fast rescue boats has completed the training programme prescribed in Regulation VI/2, paragraph 2 of the STCW Convention of 1978, as amended and the Danish order no 658 12 May 2015, as amended.	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

During the semester, the students must acquire the necessary knowledge, skills and qualifications to work on a merchant vessel as an apprentice in consideration of the ship, its crew and the environment.

The student must undergo a professional training and education to obtain the craftsman's skills that are necessary for an engineer, so the student can independently apply these skills both in planning and in execution of their craft including electro-technical maintenance and repair.

The performed tasks shall take into account environmental and safety regulations.

The student shall develop his/her understanding and insight in the relevant workmanship for an engineer, as well as the ability to assess the quality of the work performed.

The student must gain an understanding of general occupational safety and environmental issues, as well as the use of personal protective equipment.

Learning objectives

During this course, the students will be presented with various oral and written assignments, the purpose of which is to enhance their knowledge and understanding of technical and maritime English.

Navigation

Navigation I - BJ1 (34110):

- For further information, see Nautical Syllabus (BJ).

WatchKeeping

Watchkeeping Duty I - BJ1 (34300):

- For further information, see Nautical Syllabus (BJ).

Ship Technology

Practical sailing - BJ1 (35110):

- For further information, see Technology Syllabus (BJ).

Ship Technology I - BJ1 (35120):

- For further information, see Technology Syllabus (BJ).

Basic Training for Oil, Chemical & Gas Tanker Ship Technology I - BJ1 (35125):

- For further information, see Technology Syllabus (BJ).

Maritime Technology

Maintenance - BJ1 (35210):

- For further information, see Technology Syllabus (BJ).

Environment - BJ1 (35220):

- For further information, see Technology Syllabus (BJ).

Thermal Machinery and Systems I-(I+II)

Thermal machinery and Systems I-I) (BJ1) (35410):

- For further information, see Technology Syllabus (BJ).

Thermal machinery and Systems I-II (BJ1) (35420):

- For further information, see Technology Syllabus (BJ).

Electrical and Electronic Machinery I

Electrical and electronic machinery I-I (BJ1) (35810):

- For further information, see Technology Syllabus (BJ).

Electrical and electronic machinery I-II (BJ2) (35820):

- For further information, see Technology Syllabus (BJ).

Safety Training

Safety at Sea BJ1 (31110):

The student must attain **knowledge** of:

- Construction and outfit of survival craft, fast rescue boat and rescue boats, individual items of their equipment and characteristics.
- Methods of, and safety precautions of launching survival craft, fast rescue boat and rescue boat including in rough seas
- Methods of recovering survival craft, fast rescue boat and rescue boats
- Dangers associated with on-load release devices
- Maintenance procedures in relation to boats, launching- and recovery gear.
- Operating winch, brakes, falls, painters and other equipment commonly fitted
- The precautions, in the case of "man overboard" and "fire" or "lifeboat" alarm.
- General sea survival requirements, the practical use of personal survival equipment and group survival equipment available on board.

The student must attain the **skills** necessary to:

- Right an inverted life raft while wearing a lifejacket or survival suit
- Prepare and safely launch survival craft and fast rescue boat using both on-load and off-load release devices
- Safely recover survival craft, fast rescue boat and rescue boats, including proper resetting of both on-load and off-load release devices
- Understand and use the necessary orders and tasks in English for safe evacuation
- Right a capsized fast rescue boat
- Handle a fast rescue boat in prevailing and adverse weather and sea conditions

The student must acquire the necessary **competencies** to:

- Take change of a survival craft, fast rescue boat or rescue boat during and after a launch.
- Manage survival craft after abandoning ship.
- Use appropriate GMDSS equipment including signaling apparatus and pyrotechnics.
- Operate the engine of survival craft, fest rescue boat and rescue boats.
- Distinguish between the alarm signals used in commercial vessels, and explain the structure and use of a merchant ship safety plan and be able to demonstrate proper behavior according to the ships muster list.
- Use and understand the rescue means available on board properly and enter water from a certain height
- Stay fluent without buoyancy

Safety at Work - BJ1 (31120):

The student must attain **knowledge** of:

- Safety management systems – namely the concepts of safety board, designated person ashore, and near miss.
- The content of the § 17 course.

The student must attain the **skills** necessary to:

- Job related safety assessments and application of personal protective equipment.
- Understand and use rest periods at sea.

The student must acquire the necessary **competencies** to:

- Show a good and responsible attitude in relation to own and others safety.
- Choose the correct personal protective equipment based on the contents of the workplace instructions.

Elementary First Aid - BJ1 (31140):

The student must attain **knowledge** of:

- Assessment of needs of casualties and threats to own safety
- Appreciation of body structure and functions
- Understanding immediate measures to be taken in cases of emergency, including the ability to:
    - Position casualty
    - Apply resuscitation techniques
    - Control bleeding
    - Apply appropriate measures of basic shock management
    - Apply appropriate measures in event of burns scalds, including accidents caused by electric current
    - Rescue and transport a casualty
    - Improvise bandages and use materials in the emergency kit
- Body structure and function
- Fractions, dislocations and muscular injuries
- Spinal injuries
- Mental first aid
- Cardiac arrest, drowning and asphyxia

The student must attain the **skills** necessary to:

- None

The student must acquire the necessary **competencies** to:

- Take immediate action upon encountering an accident or other medical emergency

Medical First Aid – BJ6 (31141):

The student must attain **knowledge** of:

- First-aid Kit
- Body structure and function
- Toxicological hazards, including use of the MFAG for use in accidents involving Dangerous Goods
- Examination of casualty or patient
- Spinal injuries.
- Burns, scalds and effects of heat and cold
- Fractions, dislocations and muscular injuries
- Medical care of rescued persons
- Radio Medical Advice
- Pharmacology
- Sterilization
- Cardiac arrest, drowning and asphyxia

The student must attain the **skills** necessary to:

- None

The student must acquire the necessary **competencies** to:

- Apply immediate first aid in the event of accident or illness on board

Basic Fire Fighting Theory - BJ1 (31161):

The student must attain **knowledge** of:

- Shipboard fire-fighting organization
- Fire and smoke detection and automatic alarm systems
- The need for constant vigilance

The student must attain the **skills** necessary to:

- None

The student must acquire the necessary **competencies** to:

- Minimize the risk of fire and maintain a state of readiness to respond to emergency situations involving fire.

Basic Fire Fighting Course - BJ1 31162):

The student must attain **knowledge** of:

- Flammable materials, fire hazards and spread of fire
- Location of firefighting appliances and emergency escape routes
- Types and sources of ignition
- The elements of fire and explosion (the fire triangle)
- Actions to be taken on board ship
- Classification of fire and applicable extinguishing agents
- Fire-fighting equipment and its location on board
- Instruction in:
    - Fixed installations

- Fire-fighter's outfits
- Personal equipment
- Fire-fighting appliances and equipment
- Fire-fighting methods
- Fire-fighting agents
- Fire-fighting procedures
- Use of breathing apparatus for fighting fires and effecting rescues

The student must attain the **skills** necessary to:

- None

The student must acquire the necessary **competencies** to:

- Fight and extinguish fire

Advanced Fire Fighting Theory - BJ6 (31171):

The student must attain **knowledge** of:

- Ventilation control, including smoke extraction
- Control of fuel and electrical systems
- Fire-fighting process hazards (dry distillation, chemical reactions, boiler uptake fires, etc.)
- Fire-fighting involving dangerous goods
- Fire precautions and hazards associated with the storage and handling of materials (paints, etc.)

The student must attain the **skills** necessary to:

- Requirements for statutory and classification surveys
- Assessment of cause of incidents involving fire

The student must acquire the necessary **competencies** to:

- Inspect and service fire-detection and fire-extinguishing systems and equipment
- Investigate and compile reports on incidents involving fire

Advanced Fire Fighting Course - BJ6 (31172):

The student must attain **knowledge** of:

- Firefighting procedures at sea and in port with particular emphasis on organization, tactics and command
- Use of water for fire extinguishing, the effect on ship stability, precautions and corrective procedures
- Communication and coordination during fire-fighting operations
- Management and control of injured persons
- Procedures for coordination with shore-based fire fighters

The student must attain the **skills** necessary to:

- Preparation of contingency plans
- Composition and allocation of personnel to fire parties
- Strategies and tactics for control of fires in various parts of the ship
- Fire-detection systems; fixed fire-extinguishing systems; portable and mobile fire-extinguishing equipment, including appliances, pumps and rescue, salvage, life-support, personal protective and communication equipment

The student must acquire the necessary **competencies** to:

- Control fire-fighting operations aboard ships
- Organize and train fire parties

Maritime Law - BJ1 (31180):

The student must attain knowledge of his rights and obligations according to The Seamen's Act.

Designated Security Duties (DSD) - BJ1 (31190):

The student must attain **knowledge** of:

- Knowledge of current security threats and patterns;
- Recognition, on a non-discriminatory basis, of characteristics and behavioral patterns of persons who are likely to threaten security;
- Techniques used to circumvent security measures;
- Security related communications;
- Knowledge of emergency procedures and contingency plans;

The student must attain the **skills** necessary to:

- Recognize and detect weapons, dangerous substances and devices.
- Manage crowds and crowd control techniques.
- Test, calibrate and at-sea maintenance of security equipment and systems.
- Inspect, control, and monitoring techniques.
- Operate security equipment and systems.

The student must attain the **competencies** required to:

- Physically search persons, personal effects, and baggage, cargo, and ship stores.

Workshop Training

Vice Work & Technical documentation, Welding & Material Understanding, Lathing & Milling, Practical Work, Electrical and Electronic Machinery, Systems and Equipment, Thermal Machinery and Systems.

After these sub-themes, the goal is that the student must have achieved the following:

Vice Work & Technical Documentation I - BJ1 (31221):

The student must attain **knowledge** of:

- Tolerances and other quality measures used in manufacturing, repairing and maintenance
- Calculation of the rotating speed of a rotating tool.
- Safety when working with rotating tools.

The student must attain the **skills** necessary to:

- Sharpen cutting tools.

The student must acquire the necessary **competencies** to:

- Be familiar with general regulations for drawings and general drawing entries (goal, tolerances, edges, texture, etc.) in order to understand mechanical engineering drawings and be able to produce simple production- and installation drawings.

Vice Work & Technical Documentation II – BJ2 (31222):

The student must attain **knowledge** of:

- ISO standard Tolerances, quality measures and tools used in manufacturing, repairing and maintenance BJ2

The student must attain the **skills** necessary to:

- Plan smaller tasks

The student must acquire the necessary **competencies** to:

- Perform simple tasks in the manufacturing, repairing and maintenance of facilities, systems, and components using the techniques learned for vice work.

Welding & Material Understanding I - BJ1 (31230):

The student must attain **knowledge** of:

- Welding plants and operations of equipment in order to use it safely and correctly.

The student must attain the **skills** necessary to:

- Use and maintain welding systems and equipment, including conducting workplace layout when performing welding and/or cutting.

The student must acquire the necessary **competencies** to:

- Perform simple welding tasks using MMA.

Welding & Material Understanding II - BJ2 (31240):

The student must attain **knowledge** of:

- MAG welding (CO2 welding).
- The problems of welding aluminum.
- Conventional material types and their characteristics, have material composition, heat treatment and design affect the materials resistance to external influences.
- The main destructive material test methods.

The student must attain the **skills** necessary to:

- Select the most appropriate joining method taking into account the type of material and dimension used.
- assessing the quality of the craftsmanship of the work performed.

The student must acquire the necessary **competencies** to:

- Perform cutting using oxygen and gas.
- Perform welding tasks using electrode, TIG and oxygen/gas-welding for joining of iron/steel with low carbon content and TIG welding of stainless steel.
- Perform brazing in the form of silver brazing metal using gas burner.
- Use and maintain welding systems and equipment, including conducting workplace layout when performing welding and/or cutting.

Lathing and Milling - BJ2 (31260):

The student must attain **knowledge** of:

- Construction and operation of the lathe and the milling machines.
- The safe use of the lathe and the milling machine.

The student must attain the **skills** necessary to:

- Operate a lathe in a safe manner.
- Use tools for work with lathe.

The student must acquire the necessary **competencies** to:

- Manufacture and repair items on the lathe.

Practical Work - BJ2 (31270):

The student must attain **knowledge** of:

- Proper use of normally occurring components in the form of screws, bolts, nuts, washers, pins, pins, retaining rings, bearings and seals etc. and the associated principles and methods used in the assembly/disassembly and assembly/disassembly of mechanical components, including understanding the securing methods against components accidental loosening of components.

The student must attain the **skills** necessary to:

- Use drawing in the manufacturing of new product.
- Perform Gas, Water and Sanitation Work.

The student must acquire the necessary **competencies** to:

- Make an overall assessment of the safety of the performance of a task, and - before each job function performed - be aware of possible anomalies and thereby avoid accidents.
- Apply normal hand tools and measuring equipment and machinery in the form of drilling, thread cutting tools, cold saws/crosscut, and lathe and milling machines to common manufacturing, maintenance and repair tasks.
- Perform an engineering task after design drawing.

Rigging Workshop - BJ1 (31280):

The student must attain **knowledge** of:

- Technical maritime vocabulary in Danish and English.
- Methods for securing various cargos safely.
- Safety measures when operating cranes and lashing equipment, including Mean Break Load and Maximum Securing Load on ropes, wires and chains.

The student must attain the **skills** necessary to:

- Apply practical seamanship, knots, splices and bends.
- Perform start-up and operation of a standard hydraulic shipcrane, using the correct safety measures.
- Perform practical use of simple mooring equipment and arrangement.

The student must acquire necessary **competencies** to:

- Perform the knots and hitches that are appropriate in a given normal working situation and explain the advantages and disadvantages of the various knots and hitches used.
- Secure various cargos safely by performing practical seamanship..

Core literature

- Ship Knowledge - Dokmar Maritime Puplishers B.V.
- Collision Avoidance Rules - Butterworth-Heinemann
- Søfartens ABC - Iver C. Weilbach
- Søvejsregler - Iver C. Weilbach
- Navigation 1 - Iver C. Weilbach
- Navigation 2 - Iver C. Weilbach
- Smedebogen
- Grundbog i håndværk og teknik
- Grundrids af teknisk tegning.
- Brandbekæmpelse i skibe af Christen Knak.

Note: All books must be the latest edition.

Examination

Safety at Sea - BJ1 (31110):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Safety at Work - BJ1 (31120):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Safety at Work – Paragraph 17 - BJ1 (31130):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Elementary First Aid - BJ1 (31140):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Medical First Aid – BJ6 (31141):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Basic Fire fighting Theory - BJ1 (31161):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Basic Fire Fighting Course BJ1 (31162):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	On the first day of the course the student must bring a valid seafarer's health certificate or general certificate of health.
Prerequisites for examination:	None

Advanced Fire Fighting Theory - BJ6 (31171):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Advanced Fire Fighting Course - BJ6 (31172):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Maritime Law BJ1 (31180):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Designated Security Duties - BJ1 (31190):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Vice Work and Technical Documentation - BJ1 (31221):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Vice Work and Technical Documentation – BJ2 (31222):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Welding and Material Understanding I - BJ1 (31230):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Welding and Material Understanding II - BJ2 (31240):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Lathing and Milling BJ2 (31260):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Practical Work - BJ2 (31270):

Examination type:	Ongoing assesment.
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Rigging Workshop - BJ1 (31280):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Instructors of Elementary First Aid courses shall have completed a training programme for teachers of First Aid approved by the Danish First Aid Council.

Syllabus

Subject area:	**32000**	**Work Experience (BJ)**		
Subject(s):	32100	Work Experience at Sea (Total 75 ECTS)		
	32110	Introductory Work Experience at Sea	BJ2	15 ECTS
	32120	Introductory Work Experience at Sea	BJ6	15 ECTS
	32130		BJ7	30 ECTS
	32140	Professional Work Experience at Sea	BJ8	15 ECTS
Admission criteria:	Introductory Work Experience	The BJ student must have passed all subjects in the first semester of the BJ1 education in accordance to the course regulations for Ship Officer.		
	Professional Work Experience	The BJ student must have passed all the subjects in the BJ education in accordance to the course regulations for Ship Officer, except the bachelor project full mission bridge and engine room simulator.		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Four** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	BJ2 + BJ6 + BJ7 + BJ8			
ECTS credits:	75			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on Ship Officer training programme – Danish order no. 1612 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 3 February 2015, as amended.			
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/4. • Navigational at the support level. *STCW Code, as amended: Part A, chapter III - Engine department:* Section A-III/4 • Marine engineering at the support level.			
Certificate(s):	*Course Certificate of Navigational Watchkeeping* is issued upon completion of at least 2 months relevant seagoing service is proved and completed the training programme prescribed in Regulation II/4, paragraph 1 to 3 of the STCW Convention, as amended.			

Syllabus

Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	12 months = 365 calendar days 6 months = 183 calendar days 4½ months = 137 calendar days		3 months = 91 calendar days 2 months = 61 calendar days

Prerequisites for service at sea and change of study program

Service at sea:

- The duration of the introductory work experience at sea (subject: 32110+32120+32130), equaling 60 ECTS credit and the duration of the professional work experience at sea (subject: 32140), equaling 15 ECTS credits is considered fulfilled when the effective service at sea amount to a minimum of 12 months (365 calendar days).
- The professional work experience (subject: 32140) must have duration of a minimum of 3 months (91 calendar days) effective service at sea. The professional work experience cannot be replaced by other service at sea or merit from another education.
- Earned service at sea in ferries must be documented by showing a service at sea certificate. If this is not possible, the service at sea will count for 50%.

Change of study program from BJ to BM:

- By change of program from BJ to BM education, the student can transfer earned service at sea from the introductory work experience at sea (subject: 32110) in the relation 1:1, though a maximum of 3 months (91 calendar days) of service at sea can be transferred.
- From the introductory work experience at sea (subjects: 32120+32130) the student can get 50% of the earned service at sea transferred to the introductory work experience at sea in the BM education.
- The total transfer from the introductory work experience at sea in BM education cannot exceed 6 (183 calendar days) months efficient service at sea
- If a change of study causes an inconvenient study program, the student can apply for dispensation and get a part of the introductory work experience at sea postponed. However, the service at sea must at minimum be 4 months and 15 days (137 calendar days) in the introductory work experience at sea.
- The approved Training Record Book from the introductory work experience at sea in the BJ education is replaced with the green Training Record Book for Marine Engineers

Change of study program from BJ to BS:

- By change of program from BJ to BS education the student can transfer earned service at sea from the introductory work experience at sea (subject: 32110) in the relation 1:1, though a maximum of 3 months (91 calendar days) of service at sea can be transferred to the introductory work experience at sea in the BS education.
- From the professional work experience at sea (subjects: 32120+32130) the student can get 50% of the earned service at sea transferred to the introductory work experience at sea in the BS education.
- The total transfer from the introductory work experience at sea in BS education cannot exceed 6 (183 calendar days) months efficient service at sea

Purpose

During the introductory work experience at sea of 6 months = 183 calendar days, the student must also be part of the navigational watch keeping under supervision of a qualified officer in order to acquire a watchkeeping certificate in accordance with the STCW conventions regulation II/4.
The navigational watch duty should be planned such that the student also gets the opportunity to stand watch by canal passages, sailing in trafficked waters and under maneuver. Emphasis must be put on understanding the necessity of following good discipline on the bridge and in the engine room, see STCW convention chapter VIII.
The student must have completed a minimum of 6 months = 183 calendar days of navigational watch supervised by the Master or another qualified officer in accordance with STCW convention – regulation II/1.
In the professional work experience at sea, the student shall learn to work in a development-oriented and problem solving way with the profession as Master. The student will draw links between experiences and theoretical knowledge here by being able to identify and analyze subjects, fields and problems that are central in relation to the profession as Master.
The work experience shall lead to the exchange of knowledge, skills and values between education and profession/industry and the establishment of a network.

Learning objectives

Work Experience at Sea (BJ)

Introductory work experience at sea - BJ2 (32110):

The student must attain **knowledge** of:

- the maritime organization with focus on communication, safety and cooperation

The student must attain **skills** necessary to:

- apply the skills learned at the training school in a ship organization
- conduct work safety and environmental considerations correctly

The student must acquire the necessary **competencies** to:

- communicate and collaborate on a ship
- to utilize the most appropriate work method considering quality, time, material, safety and environment

Professional work experience at sea - BJ6, BJ7 & BJ8 (32120 + 32130 + 32140):

The student must attain **knowledge** of:

- the master's ordinary administrative routines
- the theory underlying the areas that the master deals with
- practical selection and application of tools and measuring equipment
- the typical ways of communication in a ship organization

The student must attain **skills** necessary to:

- handle practical situations occurring in the daily work
- apply the theory learned through the lessons
- deal with a selection of problems with a possible interdisciplinary background

The student must acquire the necessary **competencies** to:

- plan and complete smaller task belonging to the ships field of action
- participate in the ordinary administrative routines occurring on the ship
- work in an interdisciplinary way with subjects belonging to the master education
- work in a development oriented manner

Core literature

The latest issue of the "Training Record Book for preliminary seagoing service – Ships Officer Trainees".
The latest issue of the "Training Record Book for final seagoing service – Ships Officer Trainees".

Examination

Introductory work experience at sea - BJ2 (32110):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	The study administration supervises and ensures that the formal requirements in the Training Record Book are followed. If there are uncertainty or disagreements the subject is investigated by the Vice President (Academics) in collaboration with the student's shipping company. Ultimately the decision which initiative needs to be further applied to receive the grading given is decided by the Vice President (Academics). The student must also show documentation for the achieved service at sea, which must be approved by the study administration.
Prerequisites for examination:	None

Introductory work experience at sea - BJ6 (32120):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	The study administration supervises and ensures that the formal requirements in the Training Record Book are followed. If there are uncertainty or disagreements the subject is investigated by the Vice President (Academics) in collaboration with the student's shipping company. Ultimately the decision which initiative needs to be further applied to receive the grading given is decided by the Vice President (Academics). The student must show documentation for the achieved service at sea, which must be approved by the study administration.
Prerequisites for examination:	None

Introductory work experience at sea - BJ7 (32130):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	The study administration supervises and ensures that the formal requirements in the Training Record Book are followed. If there are uncertainty or disagreements the subject is investigated by the Vice President (Academics) in collaboration with the student's shipping company. Ultimately the decision which initiative needs to be further applied to receive the grading given is decided by the Vice President (Academics). The student must show documentation for the achieved service at sea, which must be approved by the study administration.
Prerequisites for examination:	None

Professional work experience at sea - BJ8 (32140):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	The study administration supervises and ensures that the formal requirements in the Training Record Book are followed. If there are uncertainty or disagreements the subject is investigated by the Vice President (Academics) in collaboration with the student's shipping company. Ultimately the decision which initiative needs to be further applied to receive the grading given is decided by the Vice President (Academics). The student must show documentation for the achieved service at sea, which must be approved by the study administration.
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**33000**	**Interdisciplinary Elements (BJ)**		
Subject(s):	33100	Interdisciplinary Elements (5 ECTS)		
	33110	Interdisciplinary Elements I	BJ3	1 ECTS
	33120	Interdisciplinary Elements II	BJ4	1 ECTS
	33130	Interdisciplinary Elements III	BJ5	3 ECTS
Admission criteria:	BJ3	Passed Introductory Work Experience at Sea		
	BJ4	None		
	BJ5	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **One** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	BJ3 + BJ4 + BJ5			
ECTS credits:	5			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			
STCW:	None			
Certificate(s):	None			
Responsible:	Subject Manager			
Valid from:	2021-1	VTA		
Expired:				
Remarks:				

Syllabus

Purpose

Interdisciplinary Elements should enhance the student's ability to solve complex problems experienced in his or hers professional life independently. Through working on projects students have the opportunity to develop competencies to evaluate and improve work flow, work processes and procedures, and thus finding innovative ways to improve these.

Learning objectives

Interdisciplinary Elements I - BJ3 (33110):

The student must attain **knowledge** of:

- Relevant professional subjects
- Problem identification

The student must attain the **skills** necessary to:

- work problemorientated

The student must acquire the necessary **competencies** to::

- Aquire and apply information on professional subjects

Interdisciplinary Elements II - BJ4 (33120):

The student must attain the **knowledge** necessary to:

- Relevant professional subjects

The student must attain the **skills** necessary to:

- Understand different perspectives on a professional subject matter
- Take a critical stance on processes and procedures

The student must acquire the necessary **competencies** to:

- Assess complex issues

Interdisciplinary Elements III - BJ5 (33130):

The student must attain **knowledge** of:

- The interdependence of professional fields

The student must attain the **skills** necessary to:

- Assess a problem from different perspectives and act taking all relevant conditions into consideration

The student must acquire the necessary **competencies** to:

- Demonstrate understanding of complex professional problems

Core Literature

N/A

Examination

Interdisciplinary Elements I- BJ3 (33110):

Examination type:	Ongoing assessment
Grade Scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Interdisciplinary Elements II - BJ4 (33120):

Examination type:	For further information see Nautic Syllabus (BJ)
Grade Scale:	
Preparation time:	
Duration:	
Aids allowed:	
Important Information:	Interdisciplinary Elements II is a part of examination of Navigation III & Meteorology II in BJ4. The student is given one grade for both subjects.
Prerequisites for examination:	For further information see Nautic Syllabus (BJ)

Interdisciplinary Elements III - BJ5 (33130):

Examination type:	For further information see Technology Syllabus (BJ)
Grade Scale:	
Preparation time:	
Duration:	
Aids allowed:	
Important Information:	Interdisciplinary Elements III is a part of examination of Thermal Machinary and Systems I – (II-VI) in BJ5. The student is given one grade for both subjects.
Prerequisites for examination:	For further information see Technology Syllabus (BJ)

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**34000**	**Nautic (BJ)**		
Subject(s):	34100	Navigation (15 ECTS)		
	34110	Navigation I	BJ1	1 ECTS
	34120	Navigation II	BJ3	5 ECTS
	34130	Navigation III	BJ4	5 ECTS
	34140	Basic Simulator Course I	BJ3	1 ECTS
	34150	Basic Simulator Course II	BJ4	1 ECTS
	34160	Advanced Simulator Course	BJ6	1 ECTS
	34170	Full Mission Bridge Simulator Course	BJ8	1 ECTS
	34200	Meteorology (6 ECTS)		
	34210	Meteorology I	BJ3	3 ECTS
	34220	Meteorology II	BJ4	3 ECTS
	34300	Watchkeeping (9 ECTS)		
	34310	Watchkeeping I	BJ1	SP11000
	34320	Watchkeeping II	BJ3	6 ECTS
	34330	GMDSS	BJ6	3 ECTS
Admission criteria:	Navigation:	BJ1: None		
		BJ3: Passed Introductory Work experience at Sea		
		BJ4: None		
	Simulator:	BJ3: Passed Introductory Work experience at Sea		
		BJ4: Passed Basic Simulator Course I		
		BJ6: Passed Basic Simulator Course II. The average of the assessments (Navigation II, Navigation III & Watchkeeping) must be at least 2.0 (no rounding)		
		BJ8: Passed Advanced Simulator Course		
	Meteorology:	BJ3: Passed Introductory Work experience at Sea		
		BJ4: None		
	Watch Keeping:	BJ1: None		
		BJ3: Passed Introductory Work experience at Sea		
		BJ6: None		

Criteria to pass subject	These assessments make up the subject: 1. **Three** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Seven** assessments graded Passed/Not Passed. • All assessments must be graded Passed.
Semester:	BJ1 + BJ3 + BJ4 + BJ6 + BJ8
ECTS credits:	30
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.
Orders:	• rder on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on tests in Radio Communication and certificate of GMDSS – Danish order no 939 of 29 August 2011, as amended. • Order on training programme and certificates for service on ships operating in Polar Waters – Danish order no 762 of 11 June 2018, as amended.
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 • Navigational at the operational level STCW Code, as amended: Part A, chapter IV – Radio operators Section A-IV/2 • Radiocommunication at the operational level as set in table A-IV/2 *STCW Code, as amended: Part A, chapter V – Special training requirements* Section A-V/4 • Basic training for ships operation in polar waters as set in table A-V/4-1. *STCW Code, as amended: Part A, chapter V – Special training requirements* Section A-V/4 • Basic training for ships operation in polar waters as set in table A-V/4-1.

Syllabus

Certificate(s):	*Certificate of Competence for GMDSS radio operators* is issued upon completion of the training programme prescribed in Regulation IV/2, paragraph 1 to 2 of the STCW Convention of 1978, as amended and the Danish order no 939 of 29 August 2011, as amended. *Course Certificate of training in the use of ARPA* is issued upon completion of the training programme prescribed in STCW-Convention of 1978, as amended: Part A, Chapter II – Master and deck department – Table A-II/1 and Table A-II/2. *Course Certificate of training in the use of generic ECDIS* is issued upon completion of the training programme prescribed in STCW Convention of 1978, as amended: Part A, Chapter II – Master and deck department – Table A-II/1 and Table A-II/2 *Certificate of proficiency in basic training for service on Ships operating in Polar Waters* is issued upon completion of the training programme prescribed in Regulation V/4, paragraph 2 of the STCW Convention of 1978, as amended and the Danish order no 762 of 11 June 2018, as amended.	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The student shall acquire the skills and knowledge in navigation, maneuvering and nautical meteorology necessary for him to plan and carry out a merchant ship's safe voyage, including to be able to function as a watchkeeping navigator on board merchant ships engaged in trade in all sea areas.

The student shall acquire the qualifications in the subject Watchkeeping, including regulations for preventing collisions at sea and Watchkeeping teams, necessary to independently function as a watch-keeping navigator.

The student shall acquire the theoretical and practical qualifications in radio communication necessary for him to carry out the communication occurring on board a merchant ship.

The student shall be able to use maritime technical terms in English and shall be qualified to use English as a working language. Furthermore, the student shall acquire the qualifications in oral and written English communication necessary to function as a master on board a merchant ship engaged in international trade.

Learning objectives

Navigation

Navigation I - BJ1 (34110):

The student must attain **knowledge** of:

- Nautical chart content and chart projection
- Basic principles of means of navigation including magnetic compass, gyrocompass and log
- Basic knowledge of technical equipment on the bridge including RADAR, GPS, VHF, AIS and ECDIS
- Compass design, compass card and it´s directions
- Speed through water, speed over ground and distances
- Magnetic compass variation and deviation,deviation tables and variation as shown on nautical paper chart
- Gyro error
- Errors and uncertainty using terrestrial positioning

The student must attain the **skills** necessary to:

- Determine ship’s position and measuer distances in the nautical paper chart and ECDIS
- Use the nautical chart and ECDIS for basic voyage planning by use of waypoints taking vessel draught and sailing directions into consideration
- Determine ship’s position by terrestrial means: marks, bearings and distance by RADAR and visually in both paper charts and ECDIS

The student must acquire necessary **competencies** to:

- Correct for current, wind, magnetic variation and deviation to obtain steered course, sailed course and course over ground
- Navigate by buoyage, IALA- system A, and cardinal marks

Navigation II - BJ3 (34120):

The student must attain **knowledge** of:

- Nautical charts and publications
- Terrestrial and coastal navigation
- Celestial navigation
- Route planning
- Ship reporting systems and VTS
- Electronic systems of position fixing and aids to navigation
- Steering gear control
- Management of the chart portfolio
- Preparation of the route plan as instructed by the management of the vessel
- Recognize the limitations of hydrographic information and charts
- Utilizing the chart for navigation
- Utilizing electronic systems of position fixing and other electronic aids to navigation
- Calculations required for determining courses, speed and positions
- Tidal calculations
- Use and understand English language in relation to navigation

Navigation III – BJ4 (34130):

The student must attain the **skills** necessary to:

- Use and understand nautical charts and publications
- Perform Terrestrial and coastal navigation
- Use Celestial navigation
- Conduct route planning
- Understand and use ship reporting systems and VTS
- Understand and use electronic systems of position fixing and aids to navigation
- Understand and use steering gear control
- Conduct management of the chart portfolio
- Conduct preparation of the route plan as instructed by the management of the vessel
- Recognize the limitations of hydrographic information and charts
- Utilizing the chart for navigation
- Utilizing electronic systems of position fixing and other electronic aids to navigation
- Calculations required for determining courses, speed and positions
- Tidal calculations
- Use and understand English language in relation to navigation

The student must acquire necessary **competencies** to:

- Determination of position
- Conducting a safe voyage
- Maintaining a safe navigational watch based upon information from all navigational equipment
- Identify and reflect on key elements within the syllabus

Technical Navigation - BJ4 (34130):

The student must attain **knowledge of**:

- Principles in satelitte based navigation
- Principles of alternative electronic systems of position fixing and navigation

- Basic principles of radiowave propagation

The student must attain the **skills** necessary to:

- Use GPS to fix own ship position
- Operate the radar in relation to both navigation and anticollision including correct adjustments in relation to weather condition and relevant operating range
- Analyze data from instruments and have knowledge of limitations, errors and uncertainty

The student must acquire necessary **competencies** to:

- Operate GPS, AIS, Radar, logsystems and Echosounder as standalone as well as integrated instrument
- Appropriate approach for use of on board instruments

Basic og Advanced Simulator Course

Radar - Basic Simulator Course I - BJ3 (34140):

The student must attain **knowledge of**:

- international performance standards related to the radar

The student must attain the **skills** necessary to:

- explain principles of the radar including factors affecting the radars performance and accuracy,
- explain how information from external sources such as gyro, log and GPS are integrated into the radar including error and uncertainty from such sources

Radar - Basic Simulator Course II - BJ4 (34150):

The student must acquire necessary **competencies** to:

- operate the radar according to the manufacturer's instructions
- perform correct startup of radar
- Identify different types of display mode
- Identify information from radar to adjust and maintain the best possible radar picture taking into account clutter, false targets, actual range and the radars performance
- analyze radar targets including echoes from Racon, SART and false targets
- perform manual radar plotting in connection with collision avoidance including trial maneuver
- fixe and analyze the position based on radar bearings and/or radar ranges
- Use parallel indexing technique in radar navigation
- Identify current and drift and use the obtained information in relation to calculation of course to steer
- Identify and observe objects observed on the radar picture
- Determine risk of collision/ close encounter with an object and be able to use the international rules of the road to make the necessary precautions to avoid collision/ close encounter
- explain test and maintenance of the radar according to manufacturer's instructions

- Recognize the effects of changes of course and/ or speed by either own ship or target in relative- and true motion
- Use rules and regulations in the international rules of the road and Watchkeeping procedures relevant in relation to the use of radar

ARPA - Basic Simulator Course I - BJ3 (34140):

The student must attain **knowledge of**:

- international performance standards related to the ARPA
- principles of ARPA operation

ARPA - Basic Simulator Course II - BJ4 (34150):

The student must attain the **skills** necessary to:

- explain factors affecting the ARPA's performance and accuracy including inputs from external sources like gyro, log and GPS
- explain the importance of ARPA alarms and use of user defined alarm levels and automatic system tests
- Recognize the effects of changes of course and/ or speed by either own ship or target in relative- and true motion
- Use rules and regulations in the international rules of the road and Watchkeeping procedures relevant in relation to the use of radar
- Use manual and automatic "acquisition" of objects
- identify and control targets observed on the radar picture
- fixe and analyze the position based on radar bearings and/ or radar ranges
- plan and use parallel indexing technique in radar navigation

ARPA – Advanced Simulator Course - BJ6 (34160):

The student must acquire necessary **competencies** to:

- operate the radars ARPA functions according to the manufacturer's instructions
- Use information obtained from the ARPA in relation to collision avoidance including trial maneuver
- Analyze the importance of relative/ true movements and speed through water/ over ground in relation to collision avoidance
- Use manual and automatic "acquisition" of objects
- fixe and analyze the position based on radar bearings and/ or radar ranges
- plan and use parallel indexing technique in radar navigation
- identify current and drift and use the obtained information to calculate course to steer
- identify and control targets observed on the radar picture
- Determine any risk of collision/ close encounter with an object and be able to use the international rules of the road to make the necessary precautions to avoid collision/ close encounter
- Recognize the effects of changes of course and/ or speed by either own ship or target in relative- and true motion
- Use rules and regulations in the international rules of the road and Watchkeeping procedures relevant in relation to the use of radar

ECDS - Basic Simulator Course I - BJ3 (34140):

The student must attain **knowledge** of:

- IMO's performance standards for ECDIS
- Limitations of ECDIS, errors and uncertainty, risk of overreliance and the effect of using different chart types

ECDS - Basic Simulator Course II - BJ4 (34150):

The student must attain **skills** necessary to:

- Operate ECDIS on board including interface with other instruments and backup systems
- Perform maintenance of ECDIS installation
- Start up of ECDIS, changing own ship parameters, testing ECDIS and updating ECDIS
- Plan a route, validate a route and analyze alarms during validation

ECDS - Advanced Simulator Course - BJ6 (14160):

The student must acquire necessary **competencies** to:

- Operate ECDIS during navigation including:
  - analyse alarms during navigation and react correct in case of malfunction
  - seek and understand relvant informations to ensure safe passage
  - compare limitations in ECDIS and its integrated instruments with the vessels actual position and use of alternative means to check the vessels position
  - Apply AIS, radar and target overlays and understand the meaning of the shown information

Full Mission Bridge Simulator Course - BJ8 (34170):

The student must attain **knowledge of**:

- use radar based on completion of an approved radar training course
- use ARPA based on completion of an approved ARPA training course
- The international rules of the road including national regulation for navigating in Danish waters
- Distress- and rescue signals
- Watchkeeping standards
- Deck log book, checklists, procedures and instructions in relation to watchkeeping
- maritime Danish and English used in relation to watchkeeping
- position fixing by means of:
  - landmarks
  - navigation Aids equipment including radar
  - dead reckoning including effects from wind and current
  - buoyage
- magnetic- and gyrocompass including determining the error in the reading
- charts and publications for voyage planning and voyage including information for determining tide
- external communication
- IMO's Standard Marine Communication Phrases (SMCP)
- Communication procedures in connection with search- and rescue operation including IMO’s IAMSAR manual

The student must attain the **skills** necessary to:

- routine check of bridge equipment according to the STCW watchkeeping standards
- regular position fixing and dead reckoning
- correct reaction on received external messages (Navtex, emergency- urgent or safety related messages)
- correct reaction on internal information including alarms
- to observe and identify objects at sea:

  - in daylight: vessel identification and classification, size, aspect, any day signals
  - in darkness: navigation light, vessel identification and classification, aspect
  - in restricted visibility: assess the state of visibility and make appropriate precautions
- in good visibility use compass bearings to determine if risk of collision exists
- in good as well as restricted visibility use radar/ ARPA for long-range scanning and to determine if risk of collision exist by radar plotting
- determine and execute correct maneuvers if risk of close quarter- or collision situation exists
- submit maneuvering signals as prescribed by the rules of the road. Observe and react on light- and sound signals from other vessels
- taking over the watch
- standing and special orders for the watch
- recording log books

The student must by navigating in costal/ narrow waters demonstrate **skills** as mentioned above and further more demonstrate ability to:

- voyage planning according to international and national rules and regulations
- perform voyage according to the planning
- identify relevant buoyage
- perform regular position fixing by independent systems and plot these into available charts
- in connection with search- and rescue operation:
  - determine and plot position of emergency
  - establish and perform correct initial radio communication in relation to the emergency
  - decide and execute immediate action including determining course, distance and ETA at meeting position with the distressed
  - by alerting Man Over Board the student should demonstrate that the MOB buoy is released and position is noted
  - initiate avoidance maneuver relevant to vessel
  - alert Captain and engineer and sound Man- Over- Board signal on board the vessel
  - maneuver the vessel towards the position of the overboard person/ buoy in an appropriate manner
  - ensure that the MOB- boat is prepared for launching
  - if deemed emit radio announcement of Man- Over- Board

The student must acquire necessary **competencies** to:

- to achieve proficiency in the performance of a navigational watch as Officer Of the Watch (OOW) including use of procedures for watchkeeping in accordance with STCW convention and international rules of the road

Meteorology

Meteorology I - BJ3 (34210):

The student must attain **knowledge** of:

- Fundamentals of Meteorology
- Meteorological Observation, organisations and services
- Wind, weather and pressure systems
- Upper air winds
- Oceans and oceanic currents
- Sea ice characteristics and areas where different type of ice can be expected in the area of operation
- Waves

- Weathercharts

Meteorology II - BJ4 (34210):

The student must attain **skills** necessary to:

- Explain fundamentals of Meteorology
- Conduct meteorological observations
- Explain wind, weather and pressure systems
- Explain upper air winds
- Explain oceans and oceanic currents
- Identify sea ice characteristics and areas where different type of ice can be expected in the area of operation
- Explain wind created wave systems and characteristics
- Use and understand weathercharts
- Use handbooks and relevant publications
- Use English phrases related to meteorology
- Interpretation of information obtained from meteorological instruments

The student must acquire necessary **competencies** to:

- Observe the weather
- analyze the weather
- Use relevant publications related to voyage planning
- Identify and reflect on key elements within the syllabus

Watchkeeping

Watchkeeping I - BJ1 (34310):

The student must attain **knowledge** of:

- Rules of the road at sea
- The ”Vagtholdsbekendtgørelsen’’ (STCW code section A-VIII/2)
- The national regulations in Danish waters

The student must attain the **skills** necessary to:

- Identify sound signals and perform safe conduct under restricted visibility
- Identify maneuvering signals
- Navigate in traffic separation systems and narrow channels
- Perform a safe lookout duty
- Translate the various terms used in watchkeeping into English

The student must acquire necessary **competencies** to:

- Identify international emergency signals
- Ascertain the presence of risk of collision
- Decide which vessel has the right of way and what action to take
- Identify various categories of vessels, lights and day signals

Watchkeeping II - BJ3 (34320):

The student must attain **knowledge** of:

- History of the Collision Regulations
- Identification and classification of all types of vessels based on lights, shapes and sound signals
- Visibility of lights and daysignals
- Positioning and technical details of lights and shapes

- Technical details of sound signal appliances
- Exemptions to the rules
- Conduct of Vessels in any Condition of Visibility
- Conduct of Vessels in Sight of One Another
- Conduct of Vessels in Restricted Visibility
- Manual plotting and actions to avoid collision
- IMO Recommendation on Navigational Watchkeeping
- Watchkeeping under certain curcomstances ex. VTS, AIS, SAR, at anchor or at ground
- National regulations

The student must attain the **skills** necessary to:

- To safely conduct a bridge watch at sea, in port and at anchor
- To conduct a manual radar plot in order to ascertain the risk of collision
- To conduct bridge watch with pilot on board (pilot assitance)
- To choose relevant navigational lights, daysignals and sound signals in any situation
- To choose relevant and legal collision avoidance manoeuvres in any situation both for vessels in sight of one another and for vessels in restricted visibility

Watchkeeping II SIMULATION (part of Watchkeeping II)

- The student must demonstrate skills necessary to:
  - To identify vessels during exercise in simulator. Idetification includes day signals and sound signals for restricted visibility
  - To avoid collision during exercise in simulator

The student must acquire necessary **competencies** to:

- To safely navigate a vessel in accordance with the International Collision Avoidance Rules and IMO Recommendation on Navigational Watchkeeping
- To avoid collision based on a manual radar plot
- To assess any situation that might occur during watch keeping and to act in accordance with International Collision Avoidance Rules and IMO Recommendation on Navigational Watchkeeping
- To cooperate about the safe navigation of the ship during times with pilot on board
- To cooperate about the safe navigation with the crew on board

GMDSS - Global Maritime Distress and Safety System - BJ6 (34330):

The student must attain **knowledge** of:

- GMDSS overwiev
- Basic methods of communication
- Shipboard equipment for GMDSS
- Ship radio license
- Maritime radio frequencies both for daily use and for distress only
- Maritime radio frequencies bandwith
- Sources of energy and battery capacity
- General regulations
- Antennas necessary to operate the equipment

The student must attain the **skills** necessary to:

- Conduct briefing about communication in general
- Use appropriate handbooks

- Use English communication phrases
- Participate in Search And Rescue (SAR/IAMSAR)
- Conduct generel troubleshooting
- Use relevant Radio- and shipslog
- Demonstrate knowledge about LRIT and SSAS
- Establish contact to Radio Medical by relevant equipment based on any given position
- Conduct daily, weekly, monthly and yearly check of equipment

The student must acquire necessary **competencies** to:

- Demonstrate the use of Distress proceures (conduct distress, urgerncy and safety calls)
- Use the Phonetic Alphabet
- Choose correct Distress-, urgency- and safety frequencies based on location
- Demonstrate the use of the equipment for routine/public calls (conduct a routine call)
- Choose correct VHF channel for daily use/routine calls (DSC, ship/ship; ship/shore; shore/ship)
- Choose correct MF/HF channel/frequency for daily use/routine calls (DSC, ship/ship; ship/shore; shore/ship)
- Identify and use relevant Distress signals
- Be able to identify relevant frequencies for transmitting and receiving transmissions on VHF, MF/HF both for daily use and for distress only
- To use relevant equipment in any situation, including; VHF, MF/HF, InmC, Fleet77, EPIRP, SART, NAVTEX/MSI and the use of DSC
- To choose relevant means of transmission in any situation (Voice/Telex/Satellite) both for daily use (public correspondance) and for distress only
- Identify Relevant GMDSS equipment for the area of trading
- Cancellation of False alert
- Conduct radio watch in any situation

Core literature

Navigation:	"Navigation 1-10," & "Opgaver"; Jørgen Wittrup or equally updated books by author Niels Holland
	"Bowditch – The American Practical Navigator"
	Other handbooks and materials as per lectureres choice – see lesson plan
Simulation:	Core literature will be introduced by responsible lecturer
Meteorology:	"Meteorologi og Oceanografi for skibsofficerer", Mette Hundahl
	Other relevant handbooks and materials as per lectureres choice – see lesson plan
Watchkeeping	"Søvejsreglerne"; Søfartsstyrelsen
	"A guide to the collision avoidance rules"; A N Cockroft and J N Lameijer
	Other relevant handbooks and materials as per lectureres choice – see lesson plan
GMDSS:	"GMDSS A user's handbook" – Forfatter: Denise Bréhaut. Forlag Bloomsbury.ISBN: 978-1-4081-8782-1. Nyeste udgave.
	"Admirality List of Radio Signals Volume 5" (in class)
	"ITU handbook" (in class)
	"IAMSAR Volume III"; (in class)
	Other relevant handbooks and materials as per lectureres choice – see lesson plan

Examination

Navigation I - BJ1 (34110):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Navigation II + Meteorology I - BJ3 (34120 & 34210):

Examination type:	Internal written test
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	3 hours
Aids allowed:	None
Important Information:	**This examination is only for students who were registered in BS3 in the fall of 2019 or earlier (2019-1, 2018-2, 2019-1 ect.).** The internal written test consists of a Navigation part and a Meteorology part; both parts must be separately passed in order to pass the test
Prerequisites for examination:	None

Navigation II + Meteorology I - BJ3 (34120 & 34210):

Examination type:	2 internal written tests
Grade scale:	7-point scale
Preparation time:	None
Duration:	2 x 2 hours
Aids allowed:	Defined by teacher – see the lesson plan
Important Information:	**This examination is for students who were registered in BS3 in the spring of 2020 or later (2020-2, 2021-1, 2021-2 ect.).** The internal written assignments consists of a Navigation part and a Meteorology part; the two assignments are given one grade of the 7 point scale and accounts for 20% of the final grade in Navigation III & Meteorology II exam.
Prerequisites for examination:	None

Navigation III + Meteorology II - BJ4 (34130 & 34220):

Examination type:	External oral exam
Grade scale:	7-point scale
Preparation time:	40 minutes
Duration:	50 minutes
Aids allowed:	The presentation portfolio folders. During the preparation time relevant software, textbooks and handbooks used during the semesters are available.
Important Information:	**This examination is only for students who were registered in BS3 in the fall of 2019 or earlier (2019-1, 2018-2, 2019-1 ect.).** In the examination room, the student draws two questions and one of the presentation portfolio folders. • The first part of the exam regarding the first drawn question lasts approximately ten minutes and is successfully completed when the student has demonstrated ability to apply his/her navigation and/or meteorology skills. • The second part of the exam regarding the second drawn question is related to technical navigation. The duration is approximately ten minutes. • As third part of the exam the student presents the portfolio and his/her reflections based on the portfolio. The duration of the presentation and

reflections should be approximately ten minutes. Following this examination will focus on the portfolio topic and can include elements of the remainder of the syllabus. The examination includes the knowledge, skills and competencies required to pass the Interdisciplinary Elements II.
The student will receive one grade based upon the student's presentation and performance at the exam.

Prerequisites for examination: None

Navigation III + Meteorology II - BJ4 (34130 & 34220):

Examination type: External oral exam
Grade scale: 7-point scale
The oral exam accounts 80% of the final grade and the assignment from Navigation II and Meteorology I accounts 20% of the final grade.
Preparation time: 40 minutes
Duration: 50 minutes
Aids allowed: The presentation portfolio folders. During the preparation time relevant software, textbooks and handbooks used during the semesters are available.
Important Information: **This examination is for students who were registered in BS3 in the spring of 2020 or later (2020-2, 2021-1, 2021-2 ect.).**
In the examination room, the student draws two questions and one of the presentation portfolio folders.

- The first part of the exam regarding the first drawn question lasts approximately ten minutes and is successfully completed when the student has demonstrated ability to apply his/her navigation and/or meteorology skills. The skill testing assignment must by appropriate to the preparation time given.
- The second part of the exam regarding the second drawn question is related to technical navigation. The duration is approximately ten minutes.
- As third part of the exam, the student presents the portfolio and his/her reflections based on the portfolio. The duration of the presentation and reflections should be approximately ten minutes. Following this examination will focus on the portfolio topic and can include elements of the remainder of the syllabus. The examination includes the knowledge, skills and competencies required to pass the Interdisciplinary Elements II.

The student will receive one grade based upon the student's presentation and performance at the exam.
The portfolio consists of 7 topics in navigation and 7 topics in meteorology

Prerequisites for examination: None

Basic Simulation Course I - BJ3 (34140):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	Compulsory attendance for all simulator exercises

Basic Simulation Course II - BJ4 (34150):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	Compulsory attendance for all simulator exercises

Advanced Simulation Course - BJ6 (34160):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	Compulsory attendance for all simulator exercises

Full Mission simulation - BJ8 (34170):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	Voyage planning must be prepared in advance of course. The student might be rejected on basis of missing planning
Prerequisites for examination:	Compulsory attendance for all simulator exercises

Watchkeeping I - BJ1 (34310):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Watchkeeping II - BJ3 (34320):

Examination type:	External written exam
Grade scale:	7-point scale
Preparation time:	None
Duration:	3 hours
Aids allowed:	None
Important Information:	None
Prerequisites for examination:	None

GMDSS - BJ6 (34330):

Examination type:	External oral test
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	45minutes
Aids allowed:	None
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator
  and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**35000**	**Technology (BJ)**		
Subject(s):	35100	Ship Technology (13 ECTS)		
	35110	Practical Sailing	BJ1	SP31000
	35120	Ship Technology I	BJ1	SP31000
	35125	Basic Training for Oil, Chemical & Gas Tanker		
	35130	Ship Technology II	BJ3[1)]	7 ECTS
	35131	Ship Technology II	BJ3[2)]	7 ECTS
	35140	Ship Technology III	BJ4[1)]	6 ECTS
	35141	Ship Technology III	BJ4[2)]	6 ECTS
	35200	Maritime Technology (5 ECTS)		
	35210	Maintenance	BJ1	SP31000
	35220	Environment	BJ1	SP31000
	35230	Maritime Technology	BJ4	5 ECTS
	1) Ship Technology II (35130) and Ship Technology III (35140) are for students who were registered in BJ3 for first time in the fall of 2018 or earlier (2018-1, 2017-2 ECTS.). 2) Ship Technology II (35131) and Ship Technology III (35141) are for students who were registered in BJ3 for first time in the spring of 2019 or later (2019-2, 2020-1 ECT.).			
Admission criteria:	Ship Technology	BJ1: None		
		BJ3: Passed Introductory Work Experience at Sea		
		BJ4: None		
	Maritime Technology	BJ1: None		
		BJ4: None		
Criteria to pass subject	These assessments make up the subject: 1. **Three** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Five** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	BJ1 + BJ3 + BJ4			
ECTS credits:	18 (=15+3)	3 ECTS-point transferred from syllabus “Management” 36000		

Syllabus

Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.	
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on training programme and certificates for service on ships operating in Polar Waters – Danish order no 762 of 11 June 2018, as amended. • Order on training programme for Tanker Operations – Danish order no 1165 2 November 2014, as amended.	
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 • Cargo handling and stowage at the operational level • Controlling the operation of the ship and care for persons on board at the operational level • Navigation at the operational level:. ○ Manouvre the ship. *STCW Code, as amended: Part A, chapter V - Special training requirements:* Section A-V/1-1-1 • Basic training for oil and chemical tanker as set in table A-V/1-1-1 Section A-V/1-2-1 • Basic training for gas tanker as set in table A-V/1-2-1 *STCW Code, as amended: Part A, chapter V – Special training requirements* Section A-V/4 • Basic training for ships operation in polar waters as set in table A-V/4-1.	
Certificate(s):	*Course Certificate of Basic Training for Oil, Chemical and Gas Tanker Cargo Operations* is issued upon completion of the training programme prescribed in Regulation V/1-1, paragraph 2.2 and Regulation V/1-2, paragraph 2.2 of the STCW Convention of 1978, as amended and the Danish order no 1165 2 November 2014, as amended. (”Carry out fire-fighting operations” as set in table A-V/1-1-1 and 1-2-1 of STCW Convention of 1978, as amended) *Certificate of proficiency in basic training for service on Ships operating in Polar Waters* is issued upon completion of the training programme prescribed in Regulation V/4, paragraph 2 of the STCW Convention of 1978, as amended and the Danish order no 762 of 11 June 2018, as amended.	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

Ship Technology II & III:

The purpose of ship technology II & III is for the student through the instruction, to acquire the qualifications in ships' design and conditions related to ships' stability, buoyancy, draught, trim and effects on the hull necessary to function safely as a watchkeeping deck officer on board merchant ships in accordance with the conventions in force.

Furthermore, the student shall acquire the qualifications necessary to function safely as a watchkeeping deck officer in connection with cargo handling and stowage on board a merchant ship engaged in inter-national trade.

Maritime Technology

The purpose of maritime technology is for the student through instructions to acquire the qualifications necessary for him to safely take care of the operation of minor ship machinery in a proper manner in terms of safety on ships where there is no requirement for an engine crew.

Furthermore, the student shall acquire an understanding of technical systems and environmental protection so that he can act safely, ration-ally and correctly as a master and localize and remedy simple defects in common technical systems in ships.

Finally, the student shall acquire practical qualifications related to structural evaluation and theoretical knowledge about maintenance enabling him to perform the function as a maintenance manager.

Learning objectives

Ship Technology

Practical sailing - BJ1 (35110):

The student must attain **knowledge** of:

- None

The student must attain the **skills** necessary to:

- Perform the knots and hitches that are appropriate in a given ship handling situation and explain the advantages and disadvantages of the various knots and hitches used.
- Perform safe ship handling
- Keep a given course
- Perform a safe start up and operation of various inboard and outboard engines on small vessels.

The student must acquire the necessary **competencies** to:

- Demonstrate Steering, maneuvering, mooring and anchoring of a small power-driven vessel.
- Perform MOB.
- Demonstrate steering and maneuvering of a vessel under oars.
- Demonstrate ability in English to understand, respond and give helm-, maneuvering-, mooring and anchoring orders.

Ship Technology I - BJ1 (35120):

The student must attain **knowledge** of:

- Technical maritime vocabulary in Danish and English
- Methods of mooring and anchoring
- Ship construction in general terms.
- Various types of vessels and their characteristics and use.

The student must attain the **skills** necessary to:

- Determine tank level by means of sounding and ullage.
- Act safely during loading and discharge of various types of vessels.
- Use the IMDG code to identify label and separate/segregate various dangerous cargoes.
- Understand and use the terms gravity, buoyancy, and water density.
- Understand the influence of the distribution of weight on the ships stability, trim and hull.

The student must acquire the necessary **competencies** to:

- Read draft marks and plimsoll marks

Basic Training for Oil, Chemical and Gas Tanker - BJ1 (35125):

The student must attain **knowledge** of:

- Types of oil, chemical and liquefied gas tankers, their equipment and operation
  - Piping systems and valves
  - Cargo pumps

  - Loading and unloading
  - Tank cleaning, purging, gas-freeing and inerting
- Cargos and properties
  - Pressure and temperature, including vapour pressure/temperature relationship
  - Types of electrostatic charge generation
  - Chemical symbols
  - ESD
- Safety culture and management
- Operational cargo hazards and how they are controlled
  - Health hazards
  - Environmental hazards
  - Corrosive hazards
  - Explosive and flammability hazards
  - Sources of ignition, including electrostatic hazards
  - Toxicity hazards
  - Vapour leaks and clouds
  - Extremely low temperatures
  - Pressure hazards
  - Inerting, water padding, drying agents and monitoring techniques
  - Anti-static measures
  - Ventilation
  - Segregation
  - Cargo inhibition
  - Importance of cargo compatibility
  - Atmospheric control
- Contents and purpose of a MSDS
- Safety equipment and PPE
  - Breathing apparatus and tank-evacuating equipment
  - Resuscitators
  - Rescue and escape equipment
- Gas-measuring equipment
- Safe operation of the vessel
- Safe working practices incl. legislation and guidelines
  - Precautions to be taken when entering enclosed spaces
  - Precautions to be taken before and during repair and maintenance work
  - Safety measures for hot and cold work
  - Electrical safety
  - Ship/shore safety check list
- Emergency action in case of injury, fire or spill
  - Reporting to responsible persons
  - SOPEP
  - Prevention of brittle fractures

The student must attain the **skills** necessary to:

- Identify and take precautions to prevent hazards
- Apply occupational health and safety precautions and measures
- Take precautions to avoid pollution from cargo

The student must acquire the necessary **competencies** to:

- Contribute to safe operation of tankers

Ship Technology II - BJ3 (35130 or 35131):

Knowledge:

- Static and dynamical stability
- Inclining experiment
- Intact stability legislation
- Internal and external factors affecting ship stability incl. superstructure and deck icing, ice accretion and prevention and removal of same
- Ice strengthening requirements and ice-class limitations
- Adverse internal and external forces affecting hull strength and how to mitigate these incl. ice pressure monitoring on hull and common areas for ice damage on hull and equipment
- Draught and Load Lines
- Damage stability

Skills:

- Apply hydrostatic data from trim and stability booklets in list, draught, transverse and longitudinal stability calculations
- Calculate stability in heavy lift situations including loss of load
- Calculate maximum draught in various load line zones
- Calculate global hull stress on box shaped vessels
- Calculate effects of simple bilging

Competencies:

- Assess compliance with general intact stability criteria including the severe wind and rolling criteria
- Assess compliance with the Load Line Convention

Ship Technology III - BJ4 (35140 or 35141):

Knowledge:

- Conventions, Codes and Guidelines pertaining to cargo operations
- Safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effects on the safety of life and the ship in all conditions including polar waters
- Optimization of ship operation by cargo planning and ballast handling in all conditions including polar waters
- The purpose of the enhanced survey program
- Damage stability regulations

Skills:

- Apply data from ship type specific trim and stability booklets in ship operation and ship stability calculations
- Cargo volume and weight calculations
- Application of codes on cargo handling
- Use of cargo stowage and securing manual
- Utilize computerized stability instruments
- Utilize damage stability information

Competencies:

- Assess ship stability and stress condition based on cargo condition and ship type specific trim and stability book including intact and damage stability criteria
- Segregate cargo in accordance with Codes and trade practice
- Interpret of stress and stability data from computerized stability instruments
- Conduct draught survey
- Assess reported defects and damage to cargo spaces, hatch covers and ballasts and take appropriate action
- Prepare plans for cargo operations and ballast handling for the ship management
- Monitor cargo operations and cargoes during voyages
- Ensure compliance with pollution prevention requirements
- Demonstrate the ability in English to explain and give orders in matters relating to cargo operations based on cargo condition and properties and on stability, draught, list, trim and stress

Maritime technology

Maintenance - BJ1 (35210):

The student must attain **knowledge** of:

- Different surface treatment methods, including paint systems and electroplating.
- Use of antifouling paints on a vessel (anti-fouling).
- The different causes of corrosion on steel and other metals and preventive action.
- Basic cleaning/de-salting of the vessel and its equipment.
- Preventive maintenance, including maintenance of intact coating and lubrication of components on a vessel.
- Various maintenance systems, including a vessel/component maintenance plan.

The student must attain the **skills** necessary to:

- None

The student must acquire the necessary **competencies** to:

- None

Environment - BJ1 (35220):

The student must attain **knowledge** of:

- MARPOL legislation at a basic level
- Air and water pollution from ships including basic combustion theory.
- Navigation in specific marine areas that have specific requirements for the composition of substances in the exhaust gas.
- Current measures to reduce emissions(NOx, SOx, CO etc.) from a vessel's main and auxiliary machinery
- The various piping arrangement on a merchant vessel for sludge, sewage, bilge, and ballast.

The student must attain the **skills** necessary to:

- Act responsibly during SOPEP drills and in emergency situations
- Act environmentally responsible in the daily routine work.
- Distinguish between bilge water, sewage, and sludge and put it into the correct tanks

The student must acquire the necessary **competencies** to:

- Know when and how to raise the alarm onboard in case of oil spill or pollution
- Handle garbage onboard according to the garbage plan.

Maritime Technology - BJ4 (35230):

The student must attain **knowledge** of:

- Operating principles and maintenance of cargo handling equipment, propulsion and maneuvering systems and firefighting systems*
- Anti-pollution procedures in and outside special areas incl. polar waters and all associated equipment incl. limitations of oil-spill equipment in polar conditions
- The importance of proactive measures to protect the environment incl. polar environment hereunder the lack of infrastructure, plans for waste storage and the effect of an oil spill in polar waters
- Maintenance theory and practice
- Environmental protection equipment
- Winterization and preparedness of vessel including deck, superstructure insulation and engine
- Engineering requirements for operating in ice incl. awareness of engine loads and cooling problems hereunder sea suction and water intake
- Polar conditions influence and limitation on performance of equipment, machinery and shipboard systems.

*For full details of knowledge learning objectives for advanced fire fighting theory see syllabus 31000

The student must attain the **skills** necessary to:

- Operate remote controls of propulsion plants, engineering systems and services

The student must acquire the necessary **competencies** to:

- Conduct operational optimization of vessel operation
- Monitor shipboard operation and ensure compliance with MARPOL requirements are fully observed in and outside special areas incl. polar waters
- Operate remote controls of propulsion plants and engineering systems and services

Core literature

Ship Technology II & III and Maritime technology

- SOLAS and associated codes
- MARPOL including annexes
- Ship Stability for Mates/Masters by Martin A. Rhodes

Examination

Practical sailing - BJ1 (35110):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Ship Technology I - BJ1 (35120):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Basic Training for Oil, Chemical and Gas Tanker - BJ1 (35125):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Ship Technology II - BJ3 (35131):

Examination type:	Internal oral test
Grade scale:	7-point scale
Preparation time:	None
Duration:	30 minutes
Aids allowed:	Only the actual cases including own supporting notes are allowed.
Important Information:	This examination is for students who were registered in BJ3 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). Each student draws a case in the examination room. The case is presented. Duration of the case presentation should last about 10 minutes and the duration of the cross evaluation of the case topic and remainder of the subject syllabus should last about 10 minutes. The cases are introduced to the students during the semester. In the examination room, each student also draws a technical question. The presentation of the technical question should last about 5 minutes. The students are familiarized with the technical questions at the latest on the last day of teaching. The student is given one grade and guidance on topics on which the student needs to focus on.
Prerequisites for examination:	None

Ship Technology III - BJ4 (35141):

Examination type:	External oral exam
Grade scale:	7-point scale
Preparation time:	24 hours
Duration:	45 minutes
Aids allowed:	During preparation time all aids are allowed. At the examination only calculations, plans, graphs and own notes supporting the presentation of the scenario are allowed.
Important Information:	This examination is for students who were registered in BJ3 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.).. Each student is randomly assigned a scenario by WiseFlow or the Student Services. The presentation must cover all relevant aspects of stability, cargo planning and handling. Where relevant decisions in cargo planning and handling based on hull stress, draught, list, transverse and longitudinal stability etc. these topics must be included. The presentation should last about 10 minutes and the duration of the cross examination of relevant topics of the scenario should last about 25 minutes. In the examination room, the student will draw a scenario requiring an oral instruction in English. Duration is about 5 minutes. The students are familiar with the scenarios requiring an oral instruction in English latest on the last day of teaching. The student is given one grade.
Prerequisites for examination:	None

Ship Technology II & III - BJ4 (35130 & 35140):

Examination type:	External oral exam
Grade scale:	7-point scale
Preparation time:	24 hours
Duration:	45 minutes
Aids allowed:	During the preparation time all aids are allowed. At the examination only calculations, graphs and short notes supporting the presentation of scenario are allowed.
Important Information:	This examination is for students who were registered in BJ3 for first time in the fall of 2018 or earlier (2018-1, 2017-2 ect.). Each student is randomly assigned a scenario by WiseFlow or by the Study Services. The presentation of the scenario covering all relevant tropics of stress, transverse and longitudinal stability, cargo handling etc. should last about 10 minutes and the duration of the cross examination in relevant tropics of the scenario is about 20 minutes. In the examination room the student will draw a technical question from the subject and a scenario requiring an oral instruction in English. Duration of the two tropics is about 10 minutes. The student is given one grade.
Prerequisites for examination:	None

Maintenance - BJ1 (35210):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Environment - BJ1 (35220):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Maritime Technology - BJ4 (35230):

Examination type:	External oral exam
Grade scale:	7-point scale)
Preparation time:	None
Duration:	30 minutes
Aids allowed:	All
Important Information:	Each student draws a shipboard system. The students are familiar with the system drawings/plans latest on the last day of teaching: The student presents the system. The presentation must include the technical configuration of the system, required maintenance and the system pollution risks and how pollution of the environment is prevented from the system.
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**35001**	**Thermal Machinery and Systems (BJ)**		
Subject(s):	35400	Thermal Machinery and Systems I (15 ECTS) (TMA)		
	35410	Thermal machinery and systems I-I (Combustion Engines - Basic)	BJ1	SP31000
	35421	Thermal machinery and systems I-II (Hydraulic and pneumatic - Basic)	BJ1	SP31000
	35430	Thermal machinery and systems I-III (Combustion engines and aux systems)	BJ5	4 ECTS
	35440	Thermal machinery and systems I-IV (Hydraulic and pneumatic systems and components)	BJ5	4 ECTS
	35450	Thermal machinery and systems I-V (Stationary steam boilers and incinerators for fossil fuels and bio waste)	BJ5	3 ECTS
	35460	Thermal machinery and systems I-VI (Pumps, compressors and associated piping and refrigeration and cooling technology)	BJ5	4 ECTS
Admission criteria:	TMS	BJ1: None		
		BJ5: None		
Criteria to pass subjects: **TMS (35001)** **EEM (35002)** **PAA (35003)**	These assessments make up the subjects (**35001**, 35002 & 35003): 1. **Four** assessments using the 7-point grade scale. (**35400=35430+35440+35450+35460**, 35830, 35840, & 35910) • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Four** assessments graded Passed/Not Passed. (**35410, 35421**, 35810 & 35820) • All assessments must be graded Passed.			
Semester:	BJ1 + BJ5			
ECTS credits:	15 ECTS point			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended.			

	• Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.	
STCW:	*STCW Code, as amended: Part A, chapter III - Engine department:* Section A-III/1 – Operational level.	
Certificate(s):		
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

Thermal Machinery and Systems I:

The central themes within the field of thermal machinery and systems shall enable the student to take care of the operation and maintenance of engine, vapor, combustion and refrigerating systems with associated systems so that these systems work reliably and economically optimal without posing a danger to the surroundings and having a harmful effect on the environment.

Learning objectives

Thermal Machinery and Systems I

Thermal machinery and systems I-I (BJ1) (35410):
Combustion engines – Basic

The student must attain **knowledge** of:

- Construction and operation of various types of diesel engines and their main components.
- The various auxiliary systems found on a merchant vessel, including boilers, air compressors, pumps, and A/C units.

The student must attain the **skills** necessary to:

- Understanding general technical documentation, in the form of PI-diagrams that can be found on a ship.
- Understanding proper tightening is performed

The student must acquire the necessary **competencies** to:

- Perform troubleshooting, disassembly and assembly of commonly occurring mechanical components.
- Use appropriate hand tools for repairs and maintenance on diesel engines.
- Conduct surveys and assess condition of engine components according to technical documentation.

Thermal machinery and systems I-II (BJ1) (35421):
Hydraulic and pneumatic – Basic

The student must attain **knowledge** of:

- Pressure and flow control in hydraulic systems.
- The importance of filtration and filter technology

The student must attain the **skills** necessary to:

- Install hydraulic pipes and fittings.
- Flush hydraulic systems

The student must acquire the necessary **competencies** to:

- Assist in minor repair and maintenance work in hydraulic and pneumatic power systems

Thermal machinery and systems I-III (BJ5) (35430):
Combustion engines and aux systems:

The student must attain **knowledge** of:

- Construction and function of different types of diesel engines
- Construction and function of the diesel engines main components
- Operational understanding regarding heat extension and heat stress in diesel engines
- Combustion process in the engine cylinder
- construction and function of aux systems and system media related to the diesel engine
- Monitoring equipment and instrumentation for diesels engines
- performance optimization with regards to the environment

The student must attain the **skills** necessary to:

- preform speed and consumption test on diesel power plant
- Calculate the power and efficiency of a diesel engine
- performance optimization with regards to reduce the impact on the environment

The student must acquire the necessary **competencies** to:

- to preform, analyze and optimize the performance of a diesel power plant

Thermal Machinery and Systems I-IV (BJ5) (35440):
Hydraulic and pneumatic systems and components:

The student must attain **knowledge** of:

- hydraulic and pneumatic main components, operation and applications
- common hydraulic and pneumatic systems, including symbols and function diagrams
- operational excellence / performance optimization in terms of environmental impact

The student must attain the **skills** necessary to:

- use the documentation for hydraulic and pneumatic systems as well as perform troubleshooting using the documentation
- safely handle and treat hydraulic oil and compressed air
- optimize hydraulic and pneumatic systems, to reduce the environmental impact

The student must acquire the necessary **competencies** to:

- selecting the correct hydraulic fluid to a hydraulic plant
- assess the purity requirements for hydraulic and pneumatic
- carry out operation and maintenance of hydraulic and pneumatic systems as well as on the basis of measurement and monitoring to take relevant measures
- to operate hydraulic and pneumatic power systems on an operational correctly way

The student must attain **knowledge** of:

- construction and operation types of marine boilers and larger stationary boilers, including exhaust boilers
- specification data for fossil fuels and bio waste
- principles of boiler combustion and combustion air systems

The student must attain the **skills** necessary to:

- operation of the boiler plant obtained by simulation training

The student must acquire the necessary **competencies** to:

- to supervise the operation mode of the steam plant and to remedy abnormal operation
- To operate the steam plant

Thermal Machinery and Systems I-V (BJ5) (35450):
Stationary steam boilers and incinerators for fossil fuels and bio waste:

The student must attain **knowledge** of:

- construction and operation types of marine boilers and larger stationary boilers, including exhaust boilers
- specification data for fossil fuels and bio waste
- principles of boiler combustion and combustion air systems

The student must attain the **skills** necessary to:

- operation of the boiler plant obtained by simulation training

The student must acquire the necessary **competences** to:

- to supervise the operation mode of the steam plant and to remedy abnormal operation
- To operate the steam plant

Thermal Machinery and Systems I-VI (BJ5) (35460):
Pumps, compressors and associated piping and refrigeration and cooling technology:

The student must attain **knowledge** of:

-
  - The cooling cycle, including evaporation, condensation, compression and expansion.
  - The isentropic refrigeration cycle in a h-log p diagram.
  - Refrigerants' physical and chemical properties, and the impact on the environment.
  - Refrigeration methods (natural and forced air circulation, dry evaporator and flooded evaporator).
  - The principles of operation and adjustment of the refrigeration system and control and safety systems.
  - The principles of one-stage CO2 cooling plants
  - The operating principle of centrifugal pumps.
  - The pumps and the associated characteristics of the system.
  - The operating principles of piston, displacement and dynamic compressors.
  - The construction principles of various types of evaporators, compressors, condensers and expansion valves

The student must attain the **skills** necessary to:

- Work with refrigeration equipment in a safe manner
- operating a pump system
- operational prevention and remedying of cavitation

The student must acquire the necessary **competencies** to:

- to supervise the operation mode of cooling and to remedy abnormal operation
- to supervise the operation mode of pump and compressor systems and to remedy abnormal operation

Core literature

Thermal machinery and systems:

- Formelsamling til brug i maskinmesteruddannelsen, Poul Erik Pedersen og Niels W. Kringelum
- Dampkedler af K.F. Larsen
- Mekanisk fysik og varmelære af Arly Nielsen
- Opgaver til mekanisk fysik og varmelære af Arly Nielsen
- Damptabeller
- Skibsdieselmotorer af Peter Storegård Jensen, 2. udgave
- Skibsmotorlære (tekst) af Christen Knak, 18. udgave
- Skibsmotorlære (tegninger) af Christen Knak, 18. udgave
- Hydraulik for driftsteknikere af Leif Terkilsen
- Noget om køleteknik af Eigil Nielsen
- Pumpebogen, Pumpe drift og energi af Thomas Heilmann, 5. udgave

Examination

Thermal Machinery and Systems I-I – BJ1 (35410):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Thermal Machinery and Systems I-II – BJ1 (35421):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Thermal Machinery and Systems I-(III-VI) - BJ5 (35400 =35430+35440+35450+35460):

Examination type:	External oral exam
Grade scale:	7-point scale
Preparation time:	72 hours
Duration:	60 minutes each group of 4 persons.
Aids allowed:	all
Important Information:	Each group is randomly assigned a scenario by WiseFlow or the Study Services and the group has a minimum of 72 hours to work out there solutions and conclusions. Each student shall prepare á 5 minutes pitch they can present in the start of the examination and they are then cross examined in all relevant topics of the scenario.
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.
-

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**35002**	**Electrical and Electronic Machinery and Systems (BJ)**		
Subject(s):	35800	Electrical and Electronic Machinery and Systems I (10 ECTS) (EEM)		
	35810	Electrical and electronic machinery I-I	BJ1	SP31000
	35820	Electrical and electronic machinery I-II	BJ2	SP31000
	35830	Electrical and electronic machinery I-III	BJ4	5 ECTS
	35840	Electrical and electronic machinery I-IV	BJ5	5 ECTS
Admission criteria:	EEM	BJ1: None		
		BJ2: None		
		BJ4: None		
		BJ5: Nono		
Criteria to pass subjects: **TMS (35001)** **EEM (35002)** **PAA (35003)**	These assessments make up the subjects (35001, **35002** & 35003): 1. **Four** assessments using the 7-point grade scale. (35400=35430+35440+35450+35460, **35830, 35840,** & 35910) • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Four** assessments graded Passed/Not Passed. (35410, 35421, **35810 & 35820**) • All assessments must be graded Passed.			
Semester:	BJ1 + BJ2 + BJ4 + BJ5			
ECTS credits:	10 ECTS point			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			
STCW:	*STCW Code, as amended: Part A, chapter III - Engine department:* Section A-III/1 – Operational level.			
Certificate(s):				

Syllabus

Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

Electrical and Electronic Machinery and Systems:

The purpose of Electrical and Electronic Machinery, Systems and Equipment is for the student to acquire qualifications within the electro-technical area to such an extent that he is able to take care of the operation and maintenance of electrical systems on board ships. The student shall be able to operate the electrical equipment under both normal and abnormal conditions and be able to carry out simple fault-finding tasks.

Learning objectives

Electrical and Electronic Machinery, Systems and Equipment I

Electrical and electronic machinery I-I (BJ1)(35810):

The student must attain **knowledge** of:

- how an electrical connection is carried out properly, taking into account stripping, clamping and relief
- principles of proper materials and components
- general voltage systems design and installations on vessels
- construction of a 3-phase non synchronic generator including coupling form
- standards and norms for electrical documentation for the single-phase installations

The student must attain the **skills** necessary to:

- use appropriate hand tools for simple tasks associated with electrical installation
- handle fittings
- use simple electro-technical documentation
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities

The student must acquire the necessary **competencies** to:

- install or replace simple components of an electrical installation under the supervision of responsible manager
- troubleshoot single-phase lighting installation
- Use of English electro-technical terminology and concepts

Electrical and electronic machinery I-II (BJ2) (35820):

The student must attain **knowledge** of:

- construction of a 3-phase non synchronic motor including coupling form
- standards and norms for electrical documentation for the 3-phase installations

The student must attain the **skills** necessary to:

- handle control and maintenance of lead accumulators
- use various types of electro-technical documentation
- perform calculations on simple electrical circuits
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities

The student must acquire the necessary **competencies** to:

- troubleshoot a 3-phase motor installation with start stop control and emergency stop
- use of English electro-technical terminology and concepts

Electrical and electronic machinery I-III (BJ4) (35830):

The student must attain **knowledge** of:

- theories Ohm's law and Kirchhoff's laws in the estimation of simple series and parallel connections of resistive circuits
- electrical and magnetic field theories for later use in electrical and electronic machinery
- AC characteristics, characteristic of AC load and AC phase shift (power factor)
- principles of 1 phase alternating current by sinus and not sinusoidal voltage including zero impedance

The student must attain the **skills** necessary to:

- use of calculations with Ohm's law and Kirchhoff's laws related to serial and parallel connections in ohmic circuit
- perform calculations relating to alternating current and the current characteristics including power factor
- perform calculations on simple combined 1 phase circuits
- construction and testing of electro-technical set-ups in the laboratory
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities

The student must acquire the necessary **competencies** to:

- handle simple serial and parallel connections based on Ohm's law and Kirsch Offs laws in connection with resistive circuits
- handle simple combined 1-phase AC circuits incl. supply source
- use English electro-technical terminology and concepts

Electrical and electronic machinery I-IV (BJ5) (35840):

The student must attain **knowledge** of:

- AC characteristics, characteristic of AC load and AC phase shift (power factor), including coils with iron core
- principles of 1-, 2- and 3-phase alternating current by sinus and not sinusoidal voltage principles for balanced or unbalanced loads at 1-, 2- and 3-phase AC circuits
- measurement methods used in the 1-, 2- and 3-phase AC systems
- selection of suitable measuring instruments
- normally present system voltages and their applications, including battery supply
- asynchronous machine operating characteristics of the engine based on knowledge of the structure, components, operation and other characteristics
- synchronous machines operating characteristics as a generator based on knowledge of the structure, components, operation and other characteristics
- interaction between the prime mover, generator, excitation, synchronization equipment, protective equipment and switching equipment
- transformed structure, components, operation and other characteristics
- be able to use the interaction between prime mover, generator, excitation, synchronization equipment, protective equipment and switching equipment in order to perform the operation of ship generators and emergency systems under normal and abnormal conditions
- distribution systems and their components
- the Classification Societies electro-technical requirements

The student must attain the **skills** necessary to:

- perform calculations in connection with the AC characteristics, characteristic of AC load and AC phase shift (power factor), including coils with iron core
- perform the relevant calculations on simple combined 1-, 2- and 3-phase AC circuits
- to make a choice among the normally occurring system voltages, including battery supply
- perform the relevant measurements of 1, 2 and 3-phase AC systems
- perform calculations in connection with choice of engines from operating and environmental parameters
- assessment of a asynchronous machineries operating characteristics as power in the choice of type and mechanical performance
- perform calculations for synchronous machines
- managing the interaction between prime mover, generator, excitation and synchronization equipment
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities
- construction and testing of electro-technical set-ups in the laboratory

The student must acquire the necessary **competencies** to:

- handle simple compound 1-, 2- and 3-phase AC circuits incl. supply source
- to carry out measurements on 1- and 3-phase AC systems
- Identify the 1-, 2- and 3-phase AC circuits in the simple operation conditions
- to participate in the construction of power plants and systems on ships
- working with different engine types in the selection, environmentally friendly operation and maintenance
- implement operation of a synchronous generator system with one or more generators
- use English electro-technical terminology and concepts

Core literature

Electrical and electronic machinery

- Elektricitet og magnetiske, nr. 1, Poul Erik Pedersen
- Opgavesamling, Elektroteknik, Poul Erik Pedersen og Niels W. Kringelum
- Elektriske maskiner, nr. 3. Poul Erik Petersen

Examination

Electrical and electronic machinery I-I (BJ1) (35810):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Electrical and electronic machinery I-II (BJ2) (35820):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Electrical and electronic machinery I-III (BJ4) (35830):

Examination type:	Internal written test
Grade scale:	7-point scale
Preparation time:	None
Duration:	2 hours
Aids allowed:	All allowed
Important Information:	None
Prerequisites for examination:	None

Electrical and electronic machinery I-IV (BJ5) (35840):

Examination type:	External written exam
Grade scale:	7-point scale
Preparation time:	None
Duration:	4 hours
Aids allowed:	All allowed
Important Information:	None
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator
  and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**35003**	**Process Analysis and Automation (BJ)**		
Subject(s):	35900	Process Analysis and Automation (5 ECTS) (PAA)		
	35910	Process analysis and automation I	BJ5	5 ECTS
Admission criteria:	PAA	BJ5: None		
Criteria to pass subjects: **TMS (35001)** **EEM (35002)** **PAA (35003)**	These assessments make up the subjects (35001, 35002 & **35003**): 1. **Four** assessments using the 7-point grade scale. (35400=35430+35440+35450+35460, 35830, 35840, & **35910**) • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **Four** assessments graded Passed/Not Passed. (35410, 35421, 35810 & 35820) • All assessments must be graded Passed.			
Semester:	BJ5			
ECTS credits:	5 ECTS point			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			
STCW:	*STCW Code, as amended: Part A, chapter III - Engine department:* Section A-III/1 – Operational level.			
Certificate(s):				
Responsible:	Subject Manager			
Valid from:	2021-1	VTA		
Expired:				
Remarks:	None			

Syllabus

Purpose

Process automation and analysis:

The purpose of Process Automation and Analysis; The student shall achieve such qualifications within data acquisition, data logging, control loops- and machine control, which is necessary to act correctly in monitoring and operating intergraded ship control systems

Learning objectives

Process Analysis and Automation

Process automation and analysis I - BJ5 (35910):

The student must attain **knowledge** of:

1. Sensors and actuators
    - Common purpose analog- and digital sensors incl. calibration and adjustment
    - Common purpose analog- and digital actuators
    - Measurement uncertainly and the impact of automation
2. Basics machine control and control of dynamic systems
    - control and controls of feedback systems
    - automation technical terminology
    - technical and theoretical fundamentals of control loops
    - different types of controls loops and individual properties of parameters
    - optimizations of set parameters in controllers
    - process Instrumentation diagrams
    - sequential machine control
3. Integrated automation systems and ship control / overall plant knowledge
    - distributed I/O
    - controllers in integrated systems
    - communication data network in automation systems
    - HMI

The student must attain the **skills** necessary to:

1. Sensors and actuators
    - use of common analog and digital sensors
    - identifying common analog and digital actuators
2. Basic concepts of automation technology
    - usage of basic concepts for control loops technics
    - usage of process instrumentation diagrams
    - basic sequential programming technique for machine control
    - technical documentation including electrical circuit diagram

The student must acquire the necessary **competencies** to:

- identifying automation components in an integrated system and getting an overall system familiarity by using ordinary technical documentation

Core literature

Process automation and analysis

- Praktisk regulering og instrumentering, Thomas Heilmann, Heilmanns Forlag,
- Logisk styring med PLC, Thomas Heilmann, Heilmanns Forlag,
- Automatiske anlæg, El-fagets forlag,

Examination

Process Analysis and Automation - BJ5 (35910):

Examination type:	External oral exam
Grade scale:	7-point scale
Preparation time:	none
Duration:	20 minutes
Aids allowed:	None
Important Information:	None
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**36000**	**Management (BJ)**		
Subject(s)	36100	Maritime Law and Ship Administration (9 ECTS)		
	36111	Maritime Law and Ship Administration I	BJ3	4 ECTS
	36121	Maritime Law and Ship Administration II	BJ4	2 ECTS
	36141	Safety and Quality Shipping	BJ3	1 ECTS
	36150	§16 Safety and Health Working Environment	BJ3	1 ECTS
	36160	Ship Security at SSO level	BJ4	1 ECTS
	36200	Methodology (4 ECTS)		
	36210	Methodology I	BJ3	1 ECTS
	36220	Methodology II	BJ4	1 ECTS
	36230	Methodology III	BJ6	2 ECTS
	35230	Maritime Technology (1 ECTS)		
	35231	Ship Propulsion	BJ4	SP35000
	35232	Auxiliary and Service Systems	BJ4	
	35260	Watchkeeping Duty in Engine, including Full Mission Engine Room Simulator Course	BJ8	1 ECTS

Admission criteria:	Maritime Law and Ship Administration	BJ3:	Passed Introductory Work Experience at Sea
		BJ4:	None
	Methodology	BJ3:	Passed Introductory Work Experience at Sea
		BJ4:	None
		BJ6:	None
	Simulator Course	BJ8:	A student must be registered in BJ8 to participate Full Mission Engine Room Simulator course.

Syllabus

Criteria to pass subject	These assessments make up the subject: 1. **Two** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **Six** assessments graded Passed/Not Passed. • All assessments must be graded Passed.	
Semester:	BJ3 + BJ4 + BJ6 + BJ8	
ECTS credits:	BJ	14 ECTS (=15+2-3 ECTS) 2 ECTS credits transferred from Syllabus Bachelor Project (BJ) 3 ECTS credits transferred to Syllabus Techology (BJ)
Course Regulation:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.	
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on training programme for maritime security of ships – Danish order no 1279 of 7 November 2013, as amended. • Order on occupational health training for members of the safety group in merchant ships and on occupational health teacher training issued by the Danish Maritime Authority – Danish order no. 795 of 22 June 2017. • Order on training programme and certificates for service on ships operating in Polar Waters – Danish order no 762 of 11 June 2018, as amended	
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 – Operational level • Controlling the operation of the ship and care for persons on board at the operational level Section A-II/2 – Management level • Controlling the operation of the ship and care for persons on board at the management level *STCW Code, as amended: Part A, chapter VI -Emergency, Safety, Security:* Section A-VI/5, paragraph 1 to 4 • Ship Security Officers as set in tablet A-VI/5 *STCW Code, as amended: Part A, chapter III – Engine department:* • Section A-III/1 - Marine engineering at the operational level as set in table A-III/1 • Section A-III/6 – Electrical, electronic and control engineering at the operational level as set in table A-III/6 where use of simulator training is relevant. *STCW Code, as amended: Part A, chapter VIII - Watchkeeping:*	

	• Section A-VIII/1 – Fitness for duty.
	• Section A-VIII/2 – Watchkeeping arrangement and principles to be observed.
	  ○ Part 1: Certification, section 2.
	  ○ Part 3: Watchkeeping principles in general
	  ○ Part 4-2: Principles to be observed in keeping an engineering watch
	  ○ Part 5: Watchkeeping in port
	  ○ Part 5-2: Taking over the engineering watch
	  ○ Part 5-4: Performing the engineering watch
	STCW Code, as amended: Part A, chapter V – Special training requirements
	Section A-V/4
	Basic training for ships operation in polar waters as set in table A-V/4-1.

Certificate(s):	*Certificate of Proficiency as Ship Security Officers* is issued when experience of at least 12 months relevant seagoing service is proved and completed the specialized training programme prescribed in Regulation VI/5 paragraph 1.2 of the STCW Convention of 1978, as amended and the Danish order no 1279 of 7 November 2013, as amended. *Course Certificate of Training in Safety & Health §16 course* is issued upon completion of the training programme prescribed in the Danish order no. 795 of 2 June 2017, as amended. *Certificate of proficiency in basic training for service on Ships operating in Polar Waters* is issued upon completion of the training programme prescribed in Regulation V/4, paragraph 2 of the STCW Convention of 1978, as amended and the Danish order no 762 of 11 June 2018, as amended.
Responsible:	Subject Manager
Valid from:	2021-1 VTA
Expired:	
Remarks:	

Purpose

Management overall:

The purpose of this Management module is to prepare the ship's officer for a future managerial position as senior officer and Master at sea or as superior on shore.
The core elements will provide the student with required qualifications within the fields of economy and quality assurance necessary to improve their personal development.
The student will also obtain the necessary qualifications within national and international maritime legislation and administrative matters to serve as master with knowledge of the duties and responsibilities associated with this position.
Students should be able to use English as the international working language in shippng management, business organization and human resources.

Maritime Law and Ship Administration & Safety and Quality Shipping:

The objective of this Subject is to qualify the student to understand and conduct the legal and administrative duties of a ship officer and master with due regard to securing the interests of his principals. These include the vessel, her owner, managers, charterer, crew, the international community and the environment.
Upon completion of the subject, the student will also gain the necessary knowledge, skills and competencies to carry out safety and quality assurance in accordance with the International Management Code for the Safe Operation of Ships and Pollution Prevention, the duties of the Ship Security Officer in accordance with the ISPS Code as well as Basic Polar Training. Furthermore, the participant will qualify to undertake the function of person in charge of safety work and as a member of the safety organization promote a safe and healthy working environment on board merchant vessels.
It is a fundamental goal of this subject that the participant understands the importance of applying his knowledge of the part-topics of this syllabus in an innovative, holistic and interdisciplinary fashion.

Methodology:

The objective of the subject methodology is to qualify the students for project work, gathering information and provide knowledge of scientific methods.

Maritime Technology:

For further information see Techonology Syllabus (BJ)

Watchkeeping Duty in Engine, including Full Mission Engine Room Simulator Course:

The purpose of the Full Mission Engineering Watch Keeping Course is to give the course participants the competency of being able to independently to be in charge of the engeneering watch (to be watchkeeping officer in the engine room).

Learning objectives

Maritime Law and Ship Administration

Maritime Law and Ship Administration I - BJ3 (36111):

The student must attain **knowledge** of:

- National and international maritime regulation
- Legislative bodies within the maritime legal system
- International conventions governing maritime law
- Seafarer's rights and obligations
- Seafarers' legal rights under MLC and collective bargaining agreements
- Crew insurance and injury
- Domestic and foreign crewing contracts
- The importance of accurate log keeping and record entries
- Antarctic Treaty and the Polar Code;

The student must attain the **skills** necessary to:

- Apply knowledge of national and international law related to their duties on board
- Determine whether the rights of the seafarer under the MLC are adhered to
- Advise ratings on their rights and obligations
- Use English terminology in relation to the ship's administration

The student must acquire the necessary **competencies** to:

- Complete correct entries in logs and record books

Maritime Law and Ship Administration II (including SSO) - BJ4 (36121):

The student must attain **knowledge** of:

- Ship Security at SSO level
- Vessel inspections
- The roles of the Flag State, Class Society, Port State Control
- Certification and adherence with governing laws and regulations
- Rest hour regulations
- Environmental protection including:
  - IMO and environmental protection conventions
  - Environmental documentation
  - Limitation of Liability for environmental claims

The student must attain the **skills** necessary to:

- Conduct Security Assessments of the vessel and be responsible for security related matters at SSO level
- Comply with legal and administrative duties under environmental law
- Comply with rest hour regulations
- Understand the interrelationship of various inspecting authorities

The student must acquire the necessary **competencies** to:

- Instruct and train crew members on security matters and pirate threats
- Participate in class and flag state inspections
- Assist in preparing the vessel for PSC inspections
- Complete logs and record books to the satisfaction of inspecting authorities

Safety and Quality Shipping (including paragraph 16) - BJ3 (36141):

The student must attain **knowledge** of:

- ISM Code and its importance in establishing safe shipboard operations
- Quality assurance through the ISM Code
- Key Performance Indicators and performance monitoring
- Vetting and commercial inspections
- General knowledge about how occupational health can form part of safety management system including procedures for securing on-board health and safety
- Understand the most important occupational health effect on passenger and cargo ships, including the most important work related diseases and occupational accidents.
- Understand the most important tasks performed by the safety organization.
- Developing the attitude of the safety organization towards promoting a safe working environment.
- Causes of vocational accidents and preventative measures taken to avoid them
- Developing the attitude of the safety organization towards promoting a safe working environment
- Accident and average investigations
- Accident reporting and route cause analysis
- Safety enhancing tools and measures the purpose of which is to promote safe operations
- Safe working practices in polar regions

The student must attain the **skills** necessary to:

- Complete non-conformance, near miss and deficiency reports
- Participate in vessel inspections at junior officer level decide upon and implement appropriate corrective actions based on audit results
- Use the ISM Code as a quality management tool in daily work and to communicate its content to the crew in an effective and understandable manner.
- Assess the effectiveness of the ISM system regarding safety, health and environmental protection as a tool for ensuring a safe working environment
- Instruct and monitor safe working practices to ensure that the work is conducted with due regard to the risk of accidents and the danger to health
- Be responsible for toolbox meetings, risk assessments, and workplace assessments
- Show responsibility and commitment in promoting the working environmental effort on board
- Update the safety organization's knowledge by retrieving information from acts, new safety regulations, material from relevant occupational health services and preventive measures.
- Issue deficiencies and non-conformances based upon observations of non-adherence with the SMS
- Conduct internal audits of the ship's Safety Management System

The student must acquire the necessary **competencies** to:

- Complete work accident reporting forms
- Assist in vessel inspections and audits
- Complete non-conformance and near miss reporting
- Performance of tasks in the safety organization including consultancy in connection with the solving of occupational health problems in order to prevent and handle occupational health related conflicts.
- Cooperation at all operational levels with a wiev to securing on-board occupational health.

- Assess the need for further training regarding the ISM code and the use of an SMS system

Methodology

Methodology I - BJ3 (36210):

The student must attain **knowledge** of:

- Study techniques and group work
- Basic information gathering
- Scientific writing
- Deductive and inductive methods of research

The student must attain the **skills** necessary to:

- Make use of the Open Learning Center and its facilities
- Prepare a correct reference list
- Put emphasis on the student's ability to formulate and spell
- Communicate in a professional language
- Take a critical position on sources of information
- Produce a paper in accordance with set requirements
- Produce a paper that is well-structured, well-balanced and meaningful in terms of content and style

The student must acquire the necessary **competencies** to

- Write a paper in accordance with academic standards

Methodology II - BJ4 (3620):

The student must attain **knowledge** of

- Academic standards
- Basic problem oriented project work
- Problem statement
- Collecting information
- Data retrieval from questionnaires
- Toulmin's model of argumentation
- Basic theory of science i.e. social sciences and the humanities, as opposed to the natural science
- Research designs

The student must attain the **skills** necessary to

- Aquire and apply knowledge in quantitative research
- Conduct a good argumentation
- Testing hypothesis
- Be able to utilize basic theory of science in research
- Understand reliability and validity in quantitative research

The student must acquire the necessary **competencies** to

- Work problem orientated
- Take a critical position on data and data retrieval
- Analyze and assess data from quantitative research

Methodology III – BJ6 (36230):

The student must attain **knowledge** of

- Advanced information acquisition
- Qualitative research methods
- Writing accurate qualitative research questions
- Classic theory of science
- Research designs
- Types of mixed method designs
- Method used to generate data in qualitative research
- The research Pentagon

The student must attain the **skills** necessary to

- Reflect on methods and sources
- Take a critical stance on choise and use of methods and sources
- Search for information in library cataloques, databases and on the internet
- Acquire and apply knowledge in research
- Select, argue for and structure a precise and relevant problem within the field of their profession
- Generate data in qualitative research
- Understand reliability and validity in qualitative research
- Design and conducting mixed research designs
- Understand the concept of triangulation of data

The student must acquire the necessary **competencies** to

- Conduct research in accordance with scientific methods and standards
- Disseminate professional issues
- Discuss methods and findings with professionals
- Utilize empirical data and scientific methods
- Identify the process for writing meaningful research questions
- Analyze and assess data from qualitative research
- Take a critical position on data and information gathered

Maritime Technology

Maritime Technology (Ship Propulsion + Auxiliary and Service Systems) - BJ4 (35231 & 35232):

- For further information see Techonology Syllabus (BJ)

Watchkeeping Duty in Engine, including Full Mission Engine Room Simulator Course – BJ8 (35260):

The student must attain **knowledge** of:

- Being in charge of, giving and recieving proper hand over the engine room watch at sea and in harbor according to “Bekendtgørelse om vagthold i skibe (Vagtholdsbekendtgørelsen)” and the STCW 2010 consolidated edition including the Manilla admentments
- Correct use of the Engineers’ Logbook and Oil Record Book
- Change over to the most important emergency systems

- Complying of security related actions in conjunction with attending the watch and knowledge about correct actions on occurrence of fire and other incidents with special provision to oil systems
- Evaluating to which degree operational irregularities influence the ships propulsion and the ships ability to manoeuvre and the needed actions under regards of the actual situation in the engine room and the manoeuvrering situation
- Assessing and communicating relevant information concerning operating disturbances that can effect the ships propulsion and manoeuvrering
- Directions, procedures and checklists concerning planning, making ready, running and shutting down of main and auxillery systems in conjunction with departure harbour, see passage and arrival harbor witrh respect to operational reliability and avoiding pollution
- Making effective use of intership communications equipment
- The use of English language in conjunction with attending the watch
- Effective communication, team work and situational awareness in the interaction with other crew members

The student must attain the **skills** necessary to:

- Be in charge of, giving and recieving proper hand over the engine room watch at sea and in harbor according to "Bekendtgørelse om vagthold i skibe (Vagtholdsbekendtgørelsen)" and the STCW 2010 consolidated edition including the Manilla admentments
- Make correct entries in the Engineers' Logbook and the Oil Record Book
- Be able to change over to the most important emergency systems
- Comply with security related actions in conjunction with attending the watch and carry out correct actions on occurrence of fire and other incidents with special provision to oil systems
- Evaluate to which degree operational irregularities influence the ships propulsion and the ships ability to manoeuvre and to perform the proper actions under consideration of the actual situation in the engine room and the manoeuvrering situation
- Assess and communicate relevant information concerning operating disturbances that can effect the ships propulsion and manoeuvrering
- Use directions, procedures and checklists during the process of planning, making ready, running and shutting down of main and auxillery systems in connection with departure harbour, see passage and arrival harbor with respect to operational reliability and avoiding pollution
- Make effective use of intership communications equipment
- Use English language in conjunction with attending the watch
- Use effective communication, team work and situational awareness in the interaction with other crew members

The student must acquire the necessary **competencies** to:

- Be able to be in the position as the engeneering watch (to be watchkeeping officer in the engine room) according to the "Bekendtgørelse om vagthold i skibe (Vagtholdsbekendtgørelsen)" and the STCW 2010 consolidated edition including the Manila admentments.

Core literature

Maritime Law and Ship Administration:

- As per course literature lists

Safety and Quality Shipping:

- As per course literature lists

Methodology:

- Den gode opgave – opgaveskrivning på videregående uddannelser, Lotte Rienecker og Peter Stray Jørgensen, 2004, Samfundslitteratur.

Maritime Technology:

- N/A

Examination

Maritime Law and Ship Administration I - BJ3 (MLSA I - 36111):

Examination type:	Ongoing assessment
Grade scale:	7-point scale
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	Maritime Law and Ship Administration I in BJ3 and Safety and Quality Shipping in BJ3 are examined together.
Prerequisites for examination:	None

Maritime Law and Ship Administration II - BJ4 (MLSA II – 36121):

Examination type:	Internal written test
Grade scale:	7-point scale
Preparation time:	None
Duration:	1½ hours
Aids allowed:	All
Important Information:	
Prerequisites for examination:	None

Safety and Quality Shipping - BJ3 (SQS – 36141):

Examination type:	See examination of MLSA I
Grade scale:	See examination of MLSA I
Preparation time:	See examination of MLSA I
Duration:	See examination of MLSA I
Aids allowed:	See examination of MLSA I
Important Information:	Maritime Law and Ship Administration I in BJ3 and Safety and Quality Shipping in BJ3 are examined together.
Prerequisites for examination:	None

Section 16. Safety and Health Working Environment - BJ3 (36150):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	Compulsory attendance for all courses related activities

Ship Security at SSO level - BJ4 (36160):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Methodology I - BJ3 (36210):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Methodology II - BJ4 (36220):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Methodology III - BJ6 (36230):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Watchkeeping Duty in Engine,
including Full Mission Engine Room Simulator Course – BJ8 (35260:

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	Compulsory attendance for all courses related activities

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator
  and
- have gained practical operational experience on the particular type of simulator being used

In accordance with the Danish order no. 765 of 22 June 2017 the instructor of §16 safety and health working environment courses shall have completed a training programme for teachers of working environment approved by the Danish Maritime Authority.

Syllabus

Subject area:	**39000**	**Bachelor Project (BJ)**		
Subject (s):	39100	Bachelor Project (15 ECTS)		
	39110	Bachelor Project	BJ8	15 ECTS
	39111	Bachelor Project in January		
	39112	Bachelor Project in April		
	39113	Bachelor Project in June		
	39114	Bachelor Project in October		
	39120	BA Methodology Course		
	39121	BA Methodology Course in January		
	39122	BA Methodology Course in April		
	39123	BA Methodology Course in June		
	39124	BA Methodology Course in October		
Admission criteria:	The final Bachelor Project period in BJ8	All subjects of the BJ education programme must be passed with accordance to the course regulations for Ship Officer, except Professional Work Experience, Full Mission Bridge Simulator Course and Full Mission Engine Room Simulator.		
Criteria to pass subject	These assessments make up the subject: 1. **One** assessments using the 7-point grade scale. • To pass the assessment the grade must be at least 02. 2. **One** assessments graded Passed/Not Passed. • Assessment must be graded Passed.			
Semester:	BJ8			
ECTS credits:	15			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			
STCW:	None			
Certificate(s):	None			

Syllabus

Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The purpose of the project is for the student to achieve competencies that contribute to the management of complex and development-oriented problems within the field of his or her profession
By drawing correlations between experience, practical skills and theoretical knowledge, the student must be able to identify, analyze and solve a specific problem, which is central and within the field of his or her profession.
The student must demonstrate the skills of independent and efficient learning by showing insight into an issue or problem, having acquired up-to-date knowledge about theories, methods, and practice that is relevant and knowledge generation within the subject area of the problem.
Through this process, the student must acquire skills in applying the knowledge previously learnt: setting up a problem statement with clear aims, use of relevant theory, systematic collation of data, and analysis and evaluation of the generated data, taking into consideration any theories relevant to the analysis, and finally stating important conclusions and recommendations..

Learning objectives

Bachelor Project - BJ8 (39111, 39112, 39113 & 39114):

The student must attain **knowledge** to:

- The scientific research method and scientific theory

The student must attain the **skills** necessary to:

- Select, argue for and structure a precise and relevant problem within the field of his or her profession.
- Search for, read, and in an appropriate way, account for and apply scientifically based knowledge relevant to the selected problem. The process will enable the student to participate and take part in any scientific study.

The student must acquire the necessary **competences** to:

- Provide and analyze relevant information and data by means of appropriate usage of relevant techniques, procedures and methods suitable to the relevant area. This may be techniques, procedures and methods acquired previously in the study program or they may be newly acquired.
- Critically evaluate a project in terms of the scientific method used, and the scientific results.
- Prepare a written report, which seems to for the reader to be structured, well-balanced and meaningful in terms of content, language, as well as style.
- Present the project and be able to discuss the results and perspectives with relevant stakeholders

BA Methodology Course – BJ8 (39121. 39122, 39123 & 39124):

The student must attain **knowledge** of:

- Define and formulate research problems and questions and, where appropriate, formulate hypotheses that can be tested
- Understand the use of, and be able to use, a range of methods and be able to decide on appropriate research designs and methods to investigate a research problem
- Understand the relationships between, and the rationale for using, particular qualitative and quantitative research methods
- Understand and master systematic critical thinking associated with argumentative writing
- Demonstrate and organize correct references
- Know how to write abstracts in the correct form and detail

The student must attain the **skills** necessary to:

- Design a feasible research study
- Determine relevant, logical and accurate research questions, study objectives and select appropriate research method(s)
- Plan, collect, manage and analyze qualitative and/or quantitative related research data and materials
- Select, analyze and structure a problem that is relevant for any research project
- Undertake a reasoned choice of methods for solving the problem, and reflect on the implications of the choices taken.

The student must acquire the necessary **competences** to:

- Differentiate between various research study designs and methods
- Carry out a scientifically valid research project
- Work with different types of approach towards analyzing qualitative and quantitative data
- Write a good abstract in English

Core literature

None

Examination

Bachelor Project - BJ8 (39111, 39112, 39113 & 39114):

Examination type:	External, Oral Exam
Grade scale:	7-point scale
Preparation time:	None
Duration:	1 hour
Aids allowed:	All
Important Information:	**Language:** • The project can be written in either English or Danish, and evaluated in the language of the student's choice. • The examination will be carried out in either English or Danish. The student must notify the student administration if the project and the examination will be held in English. Notice is given when handing in the preliminary problem statement. • The ability to formulate and spell is an integral part of the assessment of the academic content. **Examination:** • The student starts the examination with a 15 minutes' presentation. **Before examination:** • The BA methodology course must be passed before handing in the preliminary problem statement. • The preliminary problem statement must be handed in no later than 2 weeks after commencing the project period in accordance with the lesson plan • The final problem statement must be approved by the supervisor and handed in/uploaded as described in the lesson plan no later than 3 weeks before the deadline set for the final hand-in of actual project. **After examination:** • Students resitting the exam do not need to hand in a preliminary problem statement or a final problem statement, provided it has been approved by the supervisor for re-examination.
Prerequisites for Examination	• All other subjects and Professional Work Experience of the BS education programme must be passed in accordance with the course regulations for Master Mariner. • The bachelor project must be handed-in on time in accordance with the lesson plan.

BA Methodology Course - BJ8 (39121, 39122, 39123 & 39124):

Examination type:	Ongoing assessment
Grade scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	The students must attend all lessons in the BA methodology course in order to pass it.
Prerequisites for Examination	None

Qualification prerequisites for professors/instructors etc.

Associate professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is higher than the level of learning objectives for the subject and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Assistant professors can act as bachelor supervisors when they are on the final part of their master's degree.

Syllabus

Subject area:	**43000**	**Interdisciplinary Elements – SE(SCH)**		
Subject(s):	43100	Interdisciplinary Elements (5 ECTS)		
	43110	Dual Officer Project (SCH)		5 ECTS
Admission criteria:		Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
Criteria to pass subject	These assessments make up the subject: 1. **One** assessment using the 7-point grade scale. • To pass the grade must be at least 02. 2. **None** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	SE3 (SCH)			
ECTS credits:	5			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 or SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 OF 3 February 2015, as amended.			
STCW:	None			
Certificate(s):	None			
Responsible:	Subject Coordinator			
Valid from:	2021-1	VTA		
Expired:				
Remarks:				

Syllabus

Purpose

The purpose of the project is to allow the student to specialize him or herself in a certain field within their profession, and to enhance the students' competences in problem-oriented project studies.
Furthermore, to train their skills in acquiring and combining knowledge from different subject matters, previous and/or present, while working on a project through problem based learning.
The student is to achieve competencies that contribute to the management of complex and development-oriented problems.
The project must be a combination of various subjects, and the product must be a written paper and it is furthermore possible to combine the project with a practical part.

The student and the teacher in cooperation must formulate the subject and type of project, in the beginning of the course.

It is possible to work alone or in groups.

Learning objectives

Dual Officer Project – SE3 (SCH) (43110):

The student must attain **knowledge** of:

- Project management
- The complexity of professional and technical issues

The student must attain the **skills** necessary to:

- Assess complex issues and suggest solutions taking all facts and circumstances into consideration
- Writing a paper in accordance with academic standards
- Designate appropriate scientific methods

The student must acquire the necessary **competencies** to:

- Plan and conduct in accordance with scientific methods and standards
- Discuss methods and findings/ solutions with professionals

Core literature

Examination

Dual Officer Project – SE3 (SCH) (43110):

Examination type:	External Oral Exam
Grading scale:	7-point scale
Preparation time:	None
Duration:	30 min
Aids allowed:	All
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**45000**	**Technology SE (SKF & SCH)**		
Subject(s):	45300	Ship Operations (10 ECTS)		
	45310	Ship Operations (SKF & SCH)	SE1	7 ECTS
	45320	Medical Care (SKF & SCH)	SE1	3 ECTS
Admission criteria:	Ship Operations	Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
	Medical Care	None		
Criteria to pass subject	These assessments make up the subject: 1. **One** assessment using the 7-point grade scale. • To pass the grade must be at least 02. 2. **One** assessment graded Passed/Not Passed. • Assessment must be graded Passed.			
Semester:	SE1			
ECTS credits:	10 ECTS			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on training programme and certificates in taking charge of medical care on board ship – Danish order no 1116 of 10 October 2014, as amended.			
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/2 • Cargo handling and stowage at the management level. • Controlling the operation of the ship and care for persons on board at the management level Section A-II/2 • Naviation at the management level: ○ Manouvre and handle a ship in all conditions. ○ Respond to navigational emergencies *STCW Code, as amended: Part A, chapter II - Emergency, safety, security:* Section A-VI/4, paragaph 4 to 6 • Medical care as set in table A-VI/4-2			
Certificate(s):	*Certificate of Proficiency in taking charge of Medical Care on board* ship is issued upon completion of the training programme prescribed in Regulation VI/4, paragraph 2 to 3			

	of the STCW Convention of 1978, as amended and the Danish order no 1116 of 10 October 2014, as amended.	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:		

Purpose

Ship Operations:

The purpose of ship operations is for the student to gain the necessary knowledge, skills and competencies to perform the duties of master in port and at sea in an efficient, economic and safe manner whilst observing good seamanship.

Medical care:

That the participant, through active participation in the training programme, shall acquire skills so that he can act independently on board with pre-hospital procedures as well as be the responsible medical caretaker on board ships with a medicine chest category A.

Learning objectives

Ship Operations:

Ship Operations – SE1 (SKF & SCH) (45310):

Knowledge:

- Ship's maneuvering characteristics and ancillary equipment and their effect on the ship's maneuvering capabilities
- A vessels movement and characteristics in adverse conditions hereunder polar waters
- Bridge team management principles and their application
- Risk management principles
- Decision making during non-routine/emergency operations
- Factors contributing to safe operations, environmental protection and commercial interests
- Emergency towing arrangements and towing procedure
- Ship energy efficiently management and operation

Skills:

- Conduct a route optimization in deep sea and shallow waters
- Operational risk assessment during routine and extreme conditions incl. polar waters
- Undertake a qualified risk assessment of all factors contributing to the safe handling of the ship
- Obtain and maintain situational awareness
-

Competencies:

- Maneuver and handle a ship in all conditions, including emergency situations
- Respond to navigational emergencies
- Optimize planning of voyage, with regard to predicted conditions
- Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes in all conditions incl. polar
- Demonstrate ability in English to produce written reports to principals and interested parties

Medical care – SE1 (SKF & SCH) (45320):

Knowledge:

- identify, examine, handle and look after injured and sick persons;
- observe objective and subjective symptoms and document values;
- basic knowledge about anatomy and physiology related to each individual lesson;
- knowledge about medicine chest CR.

Skills:

- identify and use the mobile resuscitation equipment
- use the Danish Maritime Authority's "Medical Book for Seafarers", "Radio Medical records" and the Danish Maritime Authority's "Record, control document and user guidelines A"
- carry out independently the first-aid and pre-hospital medical caretaker procedures mentioned in the Danish Maritime Authority's "Medical Book for Seafarers"
- insert an intravenous cannula, insert a drip and use injection techniques.

Competencies;

- function as the Radio Medical doctor's eyes, ears and hands when treating a sick or injured person by using the contents of "Medical Book for Seafarers", the "Record, control document and user guidelines category A", and "Radio Medical records" under the framework of current law.

Core literature

N/A

Examination

Ship Operations – SE1 (SKF & SCH) (45310):

Examination type:	External oral exam
Grading scale:	7-point scale
Preparation time:	None
Duration:	40 minutes
Aids allowed:	The four presentation portfolio folders
Important Information:	At the oral exam of the Ship Operations, each individual student draws one of four presentation portfolio folders. The student presents the portfolio and his or her reflections based on the portfolio. Duration of the presentation and reflections should be approximately 20 minutes. Following the examination will focus on the portfolio topic and can include elements of the remainder of the subject syllabus. The portfolio topics are: • Operational Optimization • Adverse Situations • Ship Handling • Route Optimization
Prerequisites for examination:	None

Medical Care – SE1 (SKF & SCH) (45320):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**45001**	**Thermal Machinery and systems SE (MCH & SCH))**		
Subject(s)	45500	Thermal Machinery and systems II-(I-IV) (15 ECTS) (TMA)		
	45510	Thermal machinery and systems II-I (Strength of Materials and basic thermodynamics; heat transfer, fluid physics, gas physics, etc.) (MCH & SCH)	SE3	5 ECTS
	45520	Thermal machinery and systems II-II (System to transport liquids and gases) (MCH & SCH)	SE3	3 ECTS
	45530	Thermal machinery and systems II-III (Building's air conditioning and refrigeration) (MCH & SCH)	SE3	3 ECTS
	45540	Thermal machinery and systems II-IV (Environmental Facility / wastewater treatment plants and chemical process plants) (MCH & SCH)	SE3	4 ECTS
	45600	Thermal Machinery and systems III-I (10 ECTS) (TMA)		
	45610	Thermal machinery and systems III-I (System/plants of energy supply) (MCH & SCH)	SE2	10 ECTS
Admission criteria:	TMA III-I TMA II-(I-IV)	Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
Criteria to pass subject	These assessments make up the subject: 1. **Two** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) / To pass the grade must be at least 02. 2. **None** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	SE2+SE3			
ECTS credits:	25 ECTS			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.).			

	• Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.	
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 - Operational level Section A-II/2 - Management level *STCW Code, as amended: Part A, chapter II - Engine department:* Section A-III/1 - Operational level Section A-III/2 - Management level	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:		

Purpose

Thermal machines and systems are specialized themes in the work as a ships officer. The subjects in the field of thermal plants and machinery should enable the student to perform the operation and maintenance of engines, steam boilers, combustion and cooling equipment and associated systems, in order to make these systems work reliably, economically, and optimally without danger and without causing damage to the environment. This involves the structural composition, properties and strength, as well as the state of the machinery based on material samples.
The student must, through teaching, also achieve knowledge and skills concerning: water treatment, fuels, refining processes and combustion gas control.

Finally, the student acquires knowledge and skills concerning the effects of the residues and contamination products from households, transport, construction, ship plants and industrial process plants on the environment.

Learning objectives

Thermal Machinery and Systems II

General remarks – SE3 (MCH & SCH)

The overall scope of SE3 is to give the student an understanding of the physics behind thermal machinery and the transport of liquid and gases. Throughout SE3, scientific methods are implemented in all subjects in written and verbal form in order to collect, assess and analyze relevant information. Where ever relevant, English literature and manuals are used as well as the language used in the simulators is English. All abstracts handed in, must be in English. To ensure a good safety culture, this must be a part of most subjects. SE3 consists of various subjects, and during the semester there must be at least one multidisciplinary case.

Thermal Machinery and Systems II-I SE3 (MCH & SCH) (45510)

(Strength of Materials and basic thermodynamics: heat transfer, fluid physics, gas physics etc.)

The student must attain **knowledge** of:

- The theoretical circuit process-cooling and steam systems with evaporation and condensation, including enthalpies for liquid, saturated steam and superheated steam. The thermodynamic laws in the distribution and conditioning of atmospheric air.
- Various static and dynamic load types and their impact on materials, including how external forces and degrees of torque affect the stress within the material.
- How the composition, heat treatment and design affect the material's resistance to external influences.
- The main material test methods, destructive.

The student must attain the **skills** necessary to:

- Calculate the effects, consumption and efficiency in the field of thermal and mechanical energy conversion.
- Calculate the necessary heat and energy balances. Perform stress analysis based on static loads.

The student must acquire the necessary **competencies** to:

- Evaluate the condition of thermal machinery and system components

Thermal Machinery and Systems II-II SE3 (MCH & SCH) (45520):

(Systems for transport liquids and gases)

The student must attain **knowledge** of:

- Pump and flow theory for the transport of fluids.
- When there is a risk of cavitation and carry out necessary rectification.
- The principles for controlling the mass flow.
- The principles for the use of pumps connected in parallel and series.
- The characteristics pumps and plant.
- The construction of a compressed air pipe system.
- Operational excellence in terms of environmental impact.

The student must attain the **skills** necessary to:

- Prevent and remedy cavitation.
- Identify opportunities for energy optimization and perform calculations to determine the potential savings.

The student must acquire the necessary **competencies** to:

- Optimize the operation of the plant so that it runs economically and environmentally using laboratory or simulators.

Thermal Machinery and Systems II-III SE3 (MCH & SCH) (45530):

(Buildings air conditioning and refrigeration)

The student must attain **knowledge** of:

Refrigeration:

- Refrigerants' physical and chemical properties, and the impact on the environment.
- The characteristics of the evaporator and its impact on temperature as well as humidity in the refrigerator and freezer.
- The principles of two-stages CO2 cooling plants
- The principles of how to assess and adjust the control and safety systems in refrigeration plants.
- The refrigeration systems operating conditions and understanding of the evaporator and condenser pressure effect, the compression effect and the volumetric efficiency.
- Calculations of the evaporator, compressor and condenser effects and how to provide a heat balance for advanced refrigeration plants
- The emptying and filling of refrigerants in refrigeration safety and in an environmentally responsible manner.
- The design of typical systems, including one- stage systems, two-stage systems and cascade systems.
- The laws, regulations and technical requirements for refrigeration.
- The performance optimization in terms of environmental impact.

Climate control:

- Fan and plant characteristics.
- The importance of indoor climate on human comfort and hygiene.
- The state changes that atmospheric air is subjected to in an air conditioner.
- The building climate control system components and air duct systems, including fire.
- The ventilation principles and air inlet in rooms.

- The principles of operation and setting of the ventilation system control and protection system.
- Performance optimization in terms of environmental impact.

The student must attain the **skills** necessary to:

- Handle refrigerants properly and avoid spills.
- Work with refrigeration equipment in a safe manner.
- Calculate the heat exchange in a refrigeration system.
- Operate and control a ventilation plant by means of laboratory exercises.
- Use Mollier's diagram for moist air in order to assess air quality.
- Calculate the varied effects of an air conditioner.
- Optimize refrigeration and building ventilation systems, in order to reduce the environmental impact.

The student must acquire the necessary **competencies** to:

- Supervise the operation mode of the refrigeration and air conditioning systems and to remedy abnormal operation using laboratory equipment.
- Optimize the operation of refrigeration and air conditioning, so it runs economically and environmentally optimally using simulators or laboratory.

Thermal Machinery and Systems II-IV SE3 (MCH & SCH) (45540)

(Environment Facility / wastewater treatment plants and chemical process engineering)

The student must attain **knowledge** of:

- The water cycle and balance conditions in nature.
- The causes and consequences of water and air pollution.
- Methods for the purification of polluted water and air.
- Methods used to combat oil pollution at sea.
- The organic water treatment plant’s construction, operation and management.
- The sludge treatment plant’s construction, operation and management.
- The consequences of the disposal of residues and contamination products in nature.
- Basic sound theory.
- Noise and noise damage effects.
- Operational excellence in terms of environmental impact

The student must attain the **skills** necessary to:

- Perform noise measurements.
- Perform calculations of noise.
- Optimize environmental systems / wastewater treatment plants and chemical process plants, to reduce the environmental impact.

The student must acquire the necessary **competencies** to:

- Supervise the operation of environmental systems and remedy abnormal operation.
- Optimize the operation of environmental systemsto run in an economically and environmentally friendly.manner.

Thermal Machinery and Systems III

General remarks – SE2 (MCH & SCH)

The overall scope of SE2 is to prepare the student to be able to understand and optimize different processes in thermal systems. This is achieved through systematic use of simulators such as MC 90, GT and TPP. Throughout SE2, scientific methods are implemented in all subjects in written and verbal form in order to collect, assess and analyze relevant information. Where ever relevant, English literature and manuals are used as well as the language used in the simulators is English. All abstracts handed in, must be in English. To ensure a good safety culture, this must be a part of most subjects. SE2 consists of various subjects, and during the term there must be at least one multidisciplinary case including PAA.

Thermal Machinery and Systems III-I SE2 (MCH & SCH) (45610)

(System/plants of energy supply)

The student must attain **knowledge** of:

- Steam turbine design principles.
- The modes of operation in relation to condensation, bleed and backpressure at the turbine plant.
- Steam and turbine plant operating conditions, using calculations for the use of energy, such as heat balances and efficiencies.
- The free market of electricity supply in Denmark.
- The principles of boiler and turbine plant control and safety systems.
- The principles of exhaust gas condensation and absorption cooling plants
- The importance of water quality for the operation of a steam plant.
- The principles for water treatment and condensate filtering.
- Design principles for gas turbines, their operation, structure and application.
- Laws, regulations and technical requirements for the steam plant
- Installations for the production of renewable energy.
- Operational excellence in terms of environmental impact.
- The basic principles of “cracking”, decomposition of materials and electrolysis.
- The basic principles of fermentation and the production of biofuels and fuel cells.

The student must attain the **skills** necessary to:

- Calculate the effects, consumption and efficiency in boilers and calculate the heat balance in combustion, heat transfer and steam generation.
- Calculate the effects, consumption and efficiency in steam turbine plants, in different operation conditions.
- Apply the laws, regulations and technical requirements for the steam plant.
- Optimize energy systems to reduce the environmental impact.
- Understand the environmental and operational challenges of biofuels, “cracked” fuels, fuel cells and fermentation.

The student must acquire the necessary **competencies** to:

- Operate the steam plant for heating purposes and, based on measurements and monitoring, take relevant measures in to account using simulators TPP and WTE
- Supervise the operation mode of the steam plant and to remedy abnormal operation using simulators.
- Optimize the operation of the plant so that it runs economically and in an environmentally friendly manner.

Core literature

- Formelsamling til brug i maskinmesteruddannelsen, Poul Erik Pedersen og Niels W. Kringelum
- Dampkedler af K.F. Larsen
- Mekanisk fysik og varmelære af Arly Nielsen
- Opgaver til mekanisk fysik og varmelære af Arly Nielsen
- Damptabeller

Examination

Thermal machinery and systems III-I SE2 (MCH & SCH) (45610 & 45920):

Examination type:	External Oral Exam
Grade scale:	7-point scale
Preparation time:	Minimum 72 hours
Duration:	25 minutes
Aids allowed:	All
Important information:	This exam is combined with PAA II in SE2 and is a formative evaluation. The evaluation is individual. Each group is randomly assigned a scenario by WiseFlow or by the Study Services. The group has a minimum of 72 hours to work out their solutions and conclusions, and to point out all relevant information considering the scenario or system. Each student shall prepare á 5 minutes pitch that he/she presents at the start of the examination and he/she are then cross- examined in all relevant topics of the scenario. The student is given one grade for both subjects - TMA III-I & PAA II.
Prerequisites for examination:	None

Thermal machinery and systems II-(I-IV) SE3 (MCH & SCH) (45500):

Examination type:	External Oral Exam
Grade scale:	7-point scale
Preparation time:	Minimum 72 hours
Duration:	60 minutes each group of 4 persons.
Aids allowed:	All
Important information:	Each group is randomly assigned a scenario by WiseFlow or by the Study Services. The group has a minimum of 72 hours to work out their solutions and conclusions. Each student shall prepare á 5 minutes pitch that he/she presents at the start of the examination and the students are then cross- examined in all relevant topics of the scenario.
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**45002**	**Electrical and Electronic Machinery and Systems (including Elective Electrician Authorization) SE (MCH & SCH)**		
Subject(s):	45700	Electrical and Electronic Machinery and Systems (35 ECTS) (EEM)		
	45730	Electrical and electronic machinery I-VI (MCH & SCH) (**Part A**)	SE3	5 ECTS
	45740	Electrical and electronic machinery I-V (MCH & SCH) (**Part A**)	SE2	10 ECTS
	45750	Elective Electrician Authorization (The General Part & The Electrician Part) (MCH & SCH) (**Part B**) (45751 => written exam & 45752 => oral exam)	SE4	20 ECTS
Admission criteria:	EEM	SE2 & SE3: Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management) SE4: Passed subject **Part A**		
Criteria to pass subject	These assessments make up the **Part A** subject: 1. **Two** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding) 2. **None** assessments graded Passed/Not Passed. • All assessments must be graded Passed. These assessments make up the **Part B** subject: 1. **Two** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding), and to pass the written assessment (45751) the grade must be at least 02. 2. **None** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	SE2 + SE3 + SE4			
ECTS credits:	15 ECTS and 20 ECTS to Elective Electrician Authorization			
Course Regulations:	Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer - Order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who			

	were registered in SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes - order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination - order no 114 of 3 February 2015, as amended.
STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 - Operational level Section A-II/2 - Management level *STCW Code, as amended: Part A, chapter II - Engine department:* Section A-III/1 - Operational level Section A-III/2 - Management level Section A-III/6 – Electrotechnical officers
Certificate(s):	None
Responsible:	Subject Manager
Valid from:	2021-1 VTA
Expired:	
Remarks:	

Purpose

Electrical and Electronic Machinery and Systems SE2, SE3:

The purpose of Electrical and Electronic Machinery, Systems and Equipment is for the student to acquire qualifications within the electro-technical area to such an extent that he is able to take care of the operation and maintenance of electrical systems on board ships. The student shall be able to operate the electrical equipment under both normal and abnormal conditions and be able to carry out simple fault finding tasks.

Electrical and Electronic Machinery and Systems SE2, SE3:

For the module can be considered completed, the student must return all tasks participate in the electric laboratory exercises and deliver all laboratory reports on time (delivered in Moodle).

Elective Electrician authorization: SE4

The purpose of Elective Electrician authorization is for the student to acquire qualifications within the electro-technical area to such an extent that he is able to take care of the operation and maintenance of electrical systems on board ships. The student shall be able to operate the electrical equipment under both normal and abnormal conditions and be able to carry out simple fault-finding tasks.

El-Authorization - The General Part – SE4:

The student should be able to taking into account security, user requirements, environmental requirements, operational excellence wishes and regulatory requirements to perform commissioning and maintenance of electrical supply systems, electrical installations and consumption systems, performed for both high and low voltage, in accordance with relevant regulations, regulations, and directives.

El-Authorization - The Electrician Part – SE4:

The student must obtain the theoretical basis required in order to acquire an electrician's authorization *, while the choice of solutions takes into account economic, environmental and operational excellence.
* (After the apprenticeship under “installatørloven” are met)

Learning objectives

Electrical and Electronic Machinery and Systems I-VI:

Electrical and Electronic Machinery I-V - SE2 (MCH & SCH) :

The student must attain **knowledge** of:

- voltage drop calculations for installations
- short circuit calculations anywhere in electrical installations
- calculation and choice of capacitor size in the power factor systems, construction and operation of automatic power factor systems
- operational characteristics of transformers based on knowledge of the structure, components, operation and other characteristics, including couplings and parallel operation
- software programs for simulation

Electronic:

- knowledge of components – including: linear and nonlinear resistors, capacitors and inductors, diodes, transistors, operational amplifiers, controlled diodes, analog- and digital circuits
- the structure and characteristics of a three-phase rectifier and power circuits with managed and unmanaged diodes
- causes and effects of transient over-voltage and electromagnetic interference, including electromagnetic compatibility (EMC / EMI)
- principles of applied fire alarm and other alarm systems on ships and in industry
- system components for integrated realizations control with associated signal handling

The student must attain the **skills** to:

- voltage drop calculations for installations Short circuit calculations anywhere in electrical installations calculate the capacitor size to be used in a plant for simple or common power factor compensation
- perform calculations related to the use of single phase and three phase transformers including in parallel operation
- be able to handle the module relevant work safety in the laboratory exercises
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities
- construction and testing of electro-technical set-ups in the laboratory
- the application of software programs for simulation purposes

Electronic:

- perform simple calculations in electronic circuits which include linear-, nonlinear resistors, diodes, transistors and operational amplifiers
- assessment of various digital and analog circuits including among other rectifier circuits, alarm input and output cards for controlling equipment with more
- assessment of conditions which include transient surges and electromagnetic interference, including electromagnetic compatibility (EMC / EMI)
- assessment of systems and associated signal handling

The student must acquire the necessary **competencies** to:

- to assess voltage, drop and short circuit currents in installations
- take charge of operation and maintenance of electrical systems for simple and common power factor correction
- using one- and three-phase transformers
- use of English electro-technical terminology and concepts. Some of the assignments must at least contain some English chapters

Electronic:

- identifying the electronic circuits that occur in connection with alarm systems and control and regulation equipment to perform maintenance and repairs of integrated control systems

Electrical and Electronic Machinery I-VI - SE3 (MCH & SCH) :

The student must attain **knowledge** of:

- principles for using electrical components and installation methods in maritime devices
- principles for balanced or unbalanced loads at 3-phase AC circuits
- approximate voltage drop calculations for electrical installations performed on balanced and unbalanced loads
- synchronous machines operating characteristics as generator based on knowledge of the structure, components, operation and other characteristics
- power generating plant, transmission network, including relay protection
- structure the high voltage grid at the transmission, distribution network, including selectivity issue
- the Classification Societies electro-technical requirements in the maritime field

The student must attain the **skills** to:

- perform calculations on balanced or unbalanced loads at 3-phase AC circuits
- perform approximate voltage drop calculations for installations
- evaluating data sheets for synchronous generator based on knowledge of the structure, components, operation and other characteristics
- evaluating some data sheets data, for components used in high voltage systems
- be able to handle the module relevant work safety in the laboratory exercises
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities
- construction and testing of electro-technical set-ups in the laboratory

The student must acquire the necessary **competencies** to:

- to assess the importance of having balanced load at 3-phase AC systems
- to assess voltage drop and short circuit currents in installations
- operation of a synchronous generator system with one or more generators

- use of English electro-technical terminology and concepts. Some of the laboratory reports must at least contain some English chapters

Elective electrician authorization:

El-Authorization (Electrician license) - The General Part – SE4 (MCH & SCH):

The student must attain **knowledge** of:

- construction and operation of electrical installation material, including fuses and circuit breakers in order to conduct proper selection and sizing of equipment, including rules for electrical equipment insulation materiel and wire equipment assembly equipment, sockets, sizing of fuses, design of switches, dimensioning of motor protection
- analysis of the effectiveness of short-circuit protection of electric installations and selectivity, including:
    - provision of release time and specific energy anywhere in the supply / installation make the correct selection of equipment and material.
- selectivity
- power generation, transmission and main transformer stations, including errors and relay protection, including
    - structure and performance of power generation building and construction of the transmission structure and performance of the main substations
    - types of errors and relay protection principles in power generation, transmission and main transformer stations
- design and dimension of the supply to power factor systems, including dimensioning of the supply to power factor systems
- construction and operation of earthing systems, including:
    - construction and operation of operational and protective earthing in high voltage grid construction and operation of operational earthing systems in low-voltage networks
    - calculations of the earth current operating-related and protective earthing in high voltage grid
    - calculations of earth current in the earthing system of the Low Voltage
- methods for detecting ground faults on high voltage networks including relay device for detecting ground faults in high voltage distribution systems
- requirements for the operation of power facilities
- working on or near the high- and low-voltage systems, as well as power less and live

The student must attain the **skills** necessary to:

- assessment of electrical installation material, including fuses and circuit breakers, in order to be able to make the correct selection and sizing of equipment, i
    - including rules for electrical equipment insulation materiel and wire equipment
    - assembly equipment
    - sockets
    - sizing of fuses design of switches dimensioning of motor protection
- calculation of the effectiveness of short-circuit protection in power plants, as well as skills in the selection of equipment and supplies, including:
    - provision of release time and specific energy anywhere in the supply / installation make the correct selection of equipment and supplies
- assessment of the selectivity ratio
- design of power generation, transmission and main transformer stations, including errors and relay protection, including

  - structure and performance of power generation plants
  - structure and performance of transmission
  - structure and performance of the main substations
  - types of errors and relay protection principles in power generation, transmission and main transformer stations
- sizing of supply to power factor systems
- construction and planning of earthing systems, including
  - construction and operation of operational and protective earthing in high voltage grid construction and operation of operational earthing systems in low-voltage networks
  - calculations of the earth current operating-related and protective earthing in high voltage grid,
  - calculations of earth current in the earthing system of the Low Voltage
- assessment of ground faults on high voltage networks including relay device for registration of ground faults in high voltage distribution systems
- operation of power facilities and skills in planning and conducting operations on or near the high- and low-voltage systems, as well as power less and live
- be able to handle the module relevant work safety in the laboratory exercises.
- do the assessment of the safety culture concerning the construction and operation of electrical installations and facilities
- construction and testing of electro-technical set-ups in the laboratory

The student must acquire the necessary **competencies** to:

- Appointing electrical installation material, including fuses and circuit breakers sizing incl. calculation of supply for power factor correction systems,
- to participate in the operation of power facilities and participate in the planning and execution of work on or near the high- and low-voltage systems, as well as power less and live
- use of English electro-technical terminology and concepts

El-Authorization (Electrician license) - The Electrician Part – SE4:

(❶ marks that the topic is mentioned partial in the previous teaching of electrical engineering, general part*)*

student must attain **knowledge** of:

- ❶ construction and operation of electrical installation material, including fuses and circuit breakers in order to conduct proper selection and sizing of equipment, including rules for electrical equipment insulation materiel and wire equipment, assembly equipment, sockets, sizing of fuses design of switches dimensioning of motor protection
- photometric basic concepts and luminaires and light sources properties luminousness lamps and high voltage fluorescent optical properties and their installation conditions
- principles for the design of lighting systems, including:
  - account for indoor and outdoor luminaires lighting performance principles for the design of indoor and outdoor lighting systems
- electric space heating and heating methods in industrial plants, including
  - have knowledge of electrical heating of buildings have knowledge of industrial heaters
- ❶ analysis of the effectiveness of short-circuit protection of electric installations and selectivity, including:
  - provision of release time and specific energy anywhere in the supply / installation make the correct selection of equipment and material

- power generation, transmission and main transformer stations, including errors and relay protection, including:
    - structure and performance of power generation building and construction of the transmission
    - structure and performance of the main substations
    - types of errors and relay protection principles in power generation, transmission and main transformer stations
- building low-voltage distribution networks and design and dimensioning of associated wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality, including
    - analyze and identify principles of a low-voltage distribution networks building account for used equipment in low-voltage distribution networks
    - design and dimensioning low-voltage distribution networks carried by the cable
- construction of high voltage distribution network and the design and dimensioning of the corresponding wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality including :
    - analyze and identify principles of a high voltage distribution network building account for used equipment in high voltage distribution network
    - design and dimensioning high voltage distribution network performed as overhead lines and cable networks
- construction and operation of earthing systems and performing calculations of earth currents, including
    - understanding of the construction and operation of operational and protective earthing in high voltage grid
    - understanding of the construction and operation of operational earthing systems in low-voltage networks perform calculation of the earth current operating-related and protective earthing systems
    -
    - high voltage grid performs
    - calculations of earth current in the earthing system of the low voltage
- detection of ground faults on high voltage grid and relay equipment for detecting ground faults in high voltage grid
- construction of substations in distribution networks, and choice of transformers and switching devices for high and low voltage, and knowledge of the design of the corresponding high voltage cables, low voltage, over current protection and earthing systems, including
    - analyze and identify principles of a distribution transformer station building
    - sizing and selecting transformers for distribution substations
    - sizing and selecting overcurrent protection for distribution substations
    - sizing and selecting switching apparatus for distribution substations
    - sizing and selecting high voltage and low voltage lines in distribution substations
    - sizing and selecting the target fields in distribution substations sizing and selecting earthing of distribution substations
- rules and regulations for low voltage and knowledge of the design and dimensioning of such installations, including
    - building installations protection against electric shock protection against thermal stresses overcurrent
    - protection against overvoltage and under voltage separation and off switching
    - selectivity

  - using the above methods of protection
  - selection and installation of equipment provisions for special installations or areas
- rules and regulations for secondary high voltage and knowledge of the design and dimensioning of such installations, including
  - apply the rules and determines the secondary high voltage design and dimensioning of the secondary high voltage
- requirements for inspection and testing of installations prior to commissioning and the operation and maintenance of facilities, including
  - requirements for inspection and testing of installations prior to commissioning requirements for the operation and maintenance of installations.
- Rules for the construction of substations and wiring systems as well as ground connections for these station
  - understanding of SBUE
  - SBUE regulatory framework relating to the design
- ❶ regulatory framework for project planning regulations for the operation of power facilities and for planning and conducting operations on or near the high- and low-voltage systems, as well as unstressed live, including:
  - understanding of SBUE regulatory framework for the operation of power facilities
  - understanding of SBUE regulatory framework for the planning and execution of work on or near energized high- and low-voltage
  - understanding of SBUE regulatory framework for the planning and execution of work on or near energized high- and low-voltage
- requirements for machine safety and electrical equipment of machines, including
  - understanding of AT and the Machinery Directive requirements for machine safety understanding of the
- requirements for electrical equipment of machines requirements for low voltage switchgear, including busways

The student must attain the **skills** necessary to:
(❶ marks that the topic is mentioned partial in the previous teaching of electrical engineering, general part)

- ❶ assessment of electrical installation material, including fuses and circuit breakers in order to conduct proper selection and sizing of equipment, including:
  - rules for electrical equipment manager and insulation material
  - wires
  - assembly equipment sockets
  - sizing of fuses design of switches dimensioning of motor protection
- design of lighting systems, including:
  - account for indoor and outdoor luminaires lighting performance principles for the design of indoor and outdoor lighting systems
- choice of equipment for electric space heating and heating of industrial processes
  - have knowledge of electrical heating of buildings
  - have knowledge of industrial heaters
- calculation of the effectiveness of short-circuit protection in power plants, including the calculation about. fulfillment of selectivity as well as skills in the selection of equipment and supplies, including:
  - provision of release time and specific energy anywhere in the supply / installation make the correct selection of equipment and supplies
- design of power plants, transmission networks and main substations, including errors and relay protectionstructure and

  - performance of power generation plants structure and
  - performance of transmission structure and
  - performance of the main substations
  - types of errors and relay protection principles in power generation, transmission and main transformer stations
- building low-voltage distribution networks and design and dimensioning of associated wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality, including:
  - analyze and identify principles of a low-voltage distribution networks
  - building account for used equipment in low-voltage distribution networks
  - design and dimensioning low-voltage distribution networks carried by the cable
- construction of high voltage distribution network and the design and dimensioning of the corresponding wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality, including:
  - analyze and identify principles of a high-voltage distribution network building
  - explain the material used in high-voltage distribution networks
  - design and dimensioning high voltage distribution network performed as overhead lines and cable networks
- ❶ construction and operation of earthing systems and performing calculations of earth currents, including:
  - understanding of the construction and operation of operational and protective earthing in high voltage grid
  - understanding of the construction and operation of operational earthing systems in low-voltage networks
  - perform calculations of the earth current operating-related and protective earthing systems in
  - high voltage grid
  - perform calculations of earth current in the earthing system of the low voltage
- ❶ assessment of ground faults on high voltage networks including relay device for detecting ground faults in high voltage distribution systems
- construction of substations in distribution networks, and choice of transformers and switching devices for high and low voltage, and skills in the design of associated high voltage cables, low voltage, over current protection and earthing systems, including:
  - analyze and identify principles of a distribution transformer station building
  - sizing and selecting transformers for distribution substations
  - sizing and selecting overcurrent protection for distribution substations
  - design and selecting switching devices for distribution substations sizing and
  - selecting high voltage and low voltage lines in distribution substation
  - sizing and selecting the target fields in distribution substations
  - design and selecting earthing systems in distribution substationsdesign
- dimensioning of low voltage installations, including:
  - building installations protection against electric shock protection against thermal stresses overcurrent protection
  - protection against overvoltage and under voltage separation and switching off
  - selectivity
  - using the above methods of protection selection and installation of equipment
  - provisions for special installations or areas
- design and dimensioning of the secondary high-voltage installations, including:
  - apply the rules and determines the secondary high voltage

    - design and dimensioning of secondary high voltage
- requirements for inspection and testing of installations prior to commissioning and the operation and maintenance of facilities, including:
    - requirements for inspection and testing of installations prior to commissioning
    - requirements for operation and maintenance of facilities
- assessment of the performance of substations and installations and grounding etc. in and around these facilities, including:
    - understanding of SBUE regulatory framework
    - SBUE regulatory framework relating to the design
- ❶ operation of power facilities and skills in planning and conducting operations on or near the high- and low-voltage systems, as well as unstressed live, including:
    - understanding of SBUE regulatory framework for the operation of power facilities
    - understanding of SBUE regulatory framework for the planning and execution of work on or near energized high- and low-voltage
    - understanding of SBUE regulatory framework for the planning and execution of work on or near energized high- and low-voltage be able to handle the module relevant work safety in the laboratory exercises.
- do the assessment of the safety culture concern the construction and operation of electrical installations and facilities
- construction and testing of electro-technical set-ups in the laboratory

The student must acquire the necessary **competencies** to:
(❶ marks that the topic is mentioned partial in the previous teaching of electrical engineering, general part)

- appointing electrical installation material, including fuses and circuit breakers, in order to be able to make the correct selection and sizing of equipment
- participation in the design of lighting systems
- participate in the selection of equipment for electric space heaters and heating for industrial facilities
- ❶ to handle the calculation of the effectiveness of short-circuit protection in power plants, including the calculation about. fulfillment of selectivity as well as skills in the selection of equipment and supplies to
- ❶ participate in the design of power generation, transmission and main transformer stations, including errors and relay protection
- projecting low-voltage distribution networks and design and sizing associated wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality
- designing high-voltage distribution networks and design and sizing associated wires / cables and overcurrent protection with respect to the fulfillment of requirements for selectivity and power quality
- ❶ design and construction of earthing
- ❶ to identify situations with ground fault on the high voltage grid including handling relay device for detecting ground faults in high voltage distribution systems
- participate in the construction of substations in distribution network, and handle choice of transformers and switching devices for high and low voltage, as well as participate in the design of associated high voltage cables, low voltage, over current protection and earthing
- handling the design of low voltage
- to participate in the design and dimensioning of secondary high voltage

- identify routines for inspection and testing of installations prior to commissioning and the operation and maintenance of facilities
- identify substations and installations and grounding etc. and in the case of these facilities
- to participate in the operation of power facilities and participate in planning and carrying out work on or near high and low voltage, and power less as live
- use of English electro-technical terminology and concepts

Core literature

SE2	SE3	SE4				
X	X		Elektroteknik 1, Elektricitet og magnetisme	Poul Erik Petersen	Bogfondens forlag	87-7463-003-2
X	X		Elektroteknik 3, Elektriske maskiner	Poul Erik Petersen		87-7463-278-7
		X	Elektroteknik 4, Lys og varme	Poul Erik Petersen		87-7463-260-4
	X	X	Elektroteknik 5, Forsyningsnet og transformerstationer	Carsten Dahl Petersen		87-7881-439-1 Best.nr. 31082-1
X	X	X	Elektroteknik 6, El-tekniske beregninger	Niels Kringelum, Carsten Dahl Petersen		87-571-2522-1
X	X	X	Elektroteknik 8, El-installationsmateriel	Poul Erik Petersen		87-7463-272-8
X	X		Elektroteknik, Opgavesamling	Poul Erik Petersen, Niels W.Kringelum		87-7463-273-6
X	X	X	Formelsamling til brug i maskinmesteruddannelsen	Poul Erik Petersen		87-7433-274-4
		X	ElAut: Fællesregulativet 2011	Div.	Sikkerhedsstyrelsen	
		X	ElAut: Lavspændingstavler DS/EN 60439 1+2-5	Div.		
			ElAut: Samlet	Div.		87-7463-258-2
		X	ElAut: Stærkstrømsbekendtgørelse afs. 2	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 5	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 5a	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 6	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 6a	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 6b	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 6c	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 8	Div.		
		X	ElAut: Stærkstrømsbekendtgørelse afs. 9	Div.		
		X	Elektrisk udstyr på maskiner, DS/EN 60204-1:2006	Div.		

Examination

Electrical and Electronic Machinery I-V – SE2 (MCH & SCH):

Examination type:	External Written Exam
Grading scale:	7-point scale
Preparation time:	None
Duration:	4 hours
Aids allowed:	All
Important Information:	None
Prerequisites for Examination:	None

Electrical and Electronic Machinery I-VI – SE3 (MCH & SCH):

Examination type:	Internal Oral Examination
Grading scale:	7-point scale
Preparation time:	30 minutes
Duration:	30 minutes
Aids allowed:	Lab report. exercise instructions, diagrams, equipment made available and calculator.
Important Information:	The internal oral examination takes place in the laboratory. To start the examination the students drawn one of the experimental exercise known to the student as described in the lesson plan. The student has 30 minutes to prepare the experimental exercise and the examination is based on this exercise. Subsequently, the student will be examined in other learning objectives of this subject
Prerequisites for Examination:	None

El-authorization – SE4 (MCH & SCH):

Examination type:	External Oral Exam
Grading scale:	7-point scale
Preparation time:	None
Duration:	20 minutes
Aids allowed:	All
Important Information:	An appropriate number of representative exam questions will be prepared. The students are familiar with the exam questions in advance. Each student draws a random exam question on the exam day. The exam starts immediately afterwards, as the student demonstrates his I her knowledge in relation to the actual subject without aids and preparation.
Prerequisites for Examination:	None

El-authorization – SE4:

Examination type:	External Written Exam
Grading scale:	7-point scale
Preparation time:	None
Duration:	6 hours
Aids allowed:	All
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	45003	**Process Analysis and Automation SE (MCH & SCH))**		
Subject(s):	45900	Process Analysis and Automation (10 ECTS) (PAA)		
	45920	Process analysis and Automation II (MCH & SCH)	SE2	5 ECTS
	45930	Process analysis and Automation III (MCH & SCH)	SE3	5 ECTS
Admission criteria:	Process Analysis and Automation	SE2: Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
		SE3: None		
Criteria to pass subject	These assessments make up the subject: 1. **Two** assessments using the 7-point grade scale. • To pass each assessment the grade must be at least 02. 2. **None** assessments graded Passed/Not Passed. • All assessments must be graded Passed.			
Semester:	SE2 + SE3			
ECTS credits:	10 ECTS			
Course Regulations:	• Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 or SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			
STCW:	*STCW Code, as amended: Part A, chapter II - Engine department:* Section A-III/1 - Operational level Section A-III/2 - Management level			
Certificate(s):	None			
Responsible:	Subject Manager			
Valid from:	2021-1	VTA		
Expired:				
Remarks:				

Purpose

Process Analysis and Automation:

The student should acquire the necessary professional skills and knowledge so that he can perform tasks in the areas of process analysis, optimization of operations, equipment selection, troubleshooting, and maintenance requirements for automation of technological processes within transport, power plants, production- and environmental technology.
The student must also obtain the necessary professional skills in data acquisition, data logging , control and management techniques to act rationally and correctly by monitoring and operating of ship control systems

Learning objectives

Process Analysis and Automation

Process analysis and automation II – SE2 (MCH & SCH) (45920):

The student must attain **knowledge** of:

1. **Process automation**
   - PLC/controller-based controllers
   - integrated controller and control loops
   - complex controller systems design and operation including " feedforward " - and cascade control
   - control equipment for common tasks
   - practically based controller tuning and setting methods
   - Concepts and presentation of Data types
     - Signed / unsigned Interger
     - Real /Float
   - PLC Programming
     - Language
       - Ladder
       - Function Block Diagram
       - CFC
     - Program structure
       - Main program
       - Using of Sub routines
   - Functions in PLC Programming
     - Timers
     - Comparators / Counters
     - Arithmetical operators
   - Perform tasks, both practically and theoretically, so he/she are challenged to demonstrate independently innovative thinking and behavior

2. **Signals and signal conditioning**
   - interface and signal conditioning devices including I / 0 card
   - EMC
3. **Machine Control**
   - components, function and properties of the PLC / controller equipment
   - development, programming, testing and documenting control tasks in accordance with use of DS / EN 60848 and DS / EN 61131-3 or latest version.
   - PLC / controller equipment for common management tasks
   - concepts of process- and personal safety
   - commonly used safety laws, regulations, international and European directives, etc. in relation to automatic processes
   - use of commonly occurring safety components
4. **HMI (Human Machine Interface)**
   - SCADA software
   - OPC

The student must attain the **skills** necessary to:

1. **Process Automation**
   - Practical use of PLC / controller based controllers and equipment
   - use of basic integrated command and control systems for general tasks
   - use of practical controller parameter setting methods
   - study technical literature and manuals in English language
2. **Signals and signal conditioning**
   - use interface and signal conditioning devices including I / O cards
3. **Machine Control**
   - programming, testing and documenting of control function
   - using PLC / controller equipment for commonly occurring management tasks
4. **HMI (Human Machine Interface)**
   - use of SCADA software

The student must acquire the necessary **competencies** to:

- solve and automate a process from a specification in consideration of operational, functional, safety and technical considerations
- to design an HMI system
- to balance a control loop in consideration of demands and system behavior

Process analysis and automation III – SE3 (MCH & SCH) (45930):

The student must attain **knowledge** of:

- Commonly used data exchange technologies in automation networks and Ethernet TCP/IP
- Fieldbus
- Basic knowledge of data network
- Control systems structure and function by interaction with the individual components, including configuration and programming
- Concepts of data representation LSB and MSB.

The student must attain the **skills** necessary to:

- to work in a problem-oriented way in an automation -related context, both practically and theoretically, so he/she are challenged to demonstrate independently innovative thinking and behavior
- Instrumentation and measurements in processes, Including:
  - calibration and documentation
  - uncertainties and accuracy
  - different measuring principles for the determination of physical quantities
  - turndown
  - Installation and common errors sources for failure
- Parameterization
- Understand basics of data sheets for flow – and level measurements

The student must acquire the necessary **competencies** to:

- independently analyze complex automation-related issues, including acquire knowledge for the elaboration of solutions
- study technical literature and manuals in English language

Core literature

- Praktisk regulering og instrumentering, Thomas Heilmann, Heilmanns Forlag
- Logisk styring med PLC, Thomas Heilmann, Heilmanns Forlag,
- Automatiske anlæg, El-fagets forlag
- Various manuals for hard- and software, technical descriptions and datasheets for used equipment

Examination

Process analysis and automation II – SE2 (MCH & SCH) (45920):

Examination type:	External Oral Exam
Grade scale:	7-point scale
Preparation time:	72 hours
Duration:	25 minutes
Aids allowed:	All
Important information:	This exam is combined with TMA III-I in SE2 and is a formative evaluation. The evaluation is individual. Each group is randomly assigned a scenario by WiseFlow or by the Study Services. The group has a minimum of 72 hours to work out their solutions and conclusions, and to point out all relevant information considering the scenario or system. Each student shall prepare á 5 minutes pitch that he/she can present at the start of the examination and he/she are then cross- examined in all relevant topics of the scenario. The student is given one grade for both subjects – TMA III-I & PAA II.
Prerequisites for examination:	None

Process analysis and automation III – SE3 (MCH & SCH) (45930):

Examination type:	External Oral Exam
Grade scale:	7-point scale
Preparation time:	None
Duration:	30 minutes
Aids allowed:	All
Important information:	Preparing of a mandatory project / case report where academic subject and learning is the basis for examination.
Prerequisites for examination:	The mandatory project / case report had to be handed on time in accordance to lessons plan.

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**46000**	**Management SE (SKF, MCH & SCH))**		
Subject(s)	46100	Martime Law and Ship Administration (5 ECTS)		
	46130	Maritime Law and Ship Administration III (SKF & SCH)	SE1	5 ECTS
	46300	Leadership, Organization and Economics SE1 (SKF & SCH) (10 ECTS)		
		Leadership, Organization and Economics SE3 (MCH) (5 ECTS)		
	46311	Maritime Economics (SKF & SCH)	SE1	2 ECTS
		Maritime Economics (MCH)	SE3	
	46332	Human Resource Management (SKF & SCH)	SE1	5 ECTS
	46341	Standard Based Tools (SKF & SCH)	SE1	3 ECTS
		Standard Based Tools (MCH)	SE3	
Admission criteria:	Maritime Law and Ship Administration	SE1: Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
	Leadership, Organization and Economics	SE1 & SE3: Passed The Junior Officer's Examination (Dual Purpose) (Bachelor of Maritime Transport and Ship Management)		
Criteria to pass subject	These assessments make up the subject: 1. **Four** assessments using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **None** assessment graded Passed/Not Passed. • The assessment must be graded Passed.			
Semester:	SE1 + SE3			
ECTS credits:	SE1 = 15 ECTS & SE3 = 5 ECTS			
Course Regulation:	Ship Officer (BJ+SE) version 5.80, 1 February 2021.			
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 or SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.			

Syllabus

STCW:	*STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 – Operational level • Controlling the operation of the ship and care for persons on board at the operational level Section A-II/2 – Management level • Controlling the operation of the ship and care for persons on board at the management level	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:		

Purpose

Management overall:

The purpose of this Management module is to prepare the ship's officer for a future managerial position as senior officer and Master at sea or as superior on shore.
The core elements will provide the student with the required qualifications within the fields of economy and quality assurance necessary to improve their personal development.
The student will also obtain the necessary qualifications within national and international maritime legislation and administrative matters to serve as master with knowledge of the duties and responsibilities associated with this position.
Students should be able to use English as the international working language in shippng management, business organization and human resources.

Maritime Law and Ship Administration:

The objective of this subject is to qualify the student to understand and conduct the legal and administrative duties of a ship officer and master with due regard to securing the interests of his principals. These include the vessel, her owner, managers, charterer, crew, the international community and the environment.
Upon completion of the subject, the student will also gain the necessary knowledge, skills and competences to carry out safety and quality assurance in accordance with the International Management Code for the Safe Operation of Ships and Pollution Prevention, the duties of the Ship Security Officer in accordance with the ISPS Code as well as Basic Polar Training. Furthermore, the participant will qualify to undertake the function of person in charge of safety work and as a member of the safety organization promote a safe and healthy working environment on board merchant vessels.
This subject will provide the student with knowledge, skills and competences to understand the structure of the Maritime Organistaion at national and international level including a holistic understading of ship owning and management seen in the complex context of the shipping trade.
It is a fundamental goal of this subject that the participant understands the importance of applying his knowledge of the part-topics of this syllabus in an innovative, holistic and interdisciplinary fashion.

Maritime Economics:

The objective of this subject it to qualify the student to understand and conduct economic and business duties of a ship officer and master with due regard to securing the interests of his principals. These include the vessel, her owner, managers, charterer, crew and the international community.
Upon completion of the subject, the student will gain the necessary knowledge, understanding, skills and competences to carry out the economical control and management of a ship. It is a fundamental goal of this subject that the participant understands the importance of applying his knowledge of the part-topics of this syllabus in an innovative, holistic and interdisciplinary fashion.

Human Resource Management:

The objective of this subject it to prepare the student for the role of master where he will be required to promote the development process of subordinates within the organization and acquire the necessary Human Ressource Management and Crew Ressource Management skills to perform

leadership in a global perspective. Furthermore the student will understand organizational processes and basic strategic management.

Standard Based Tools:

Will provide the student with a fundamental understanding of principles, methods and regulation within the field of occupational Health, Safety, Environment and Quality management systems. This will enable them to implement, coordinate and monitor these systems at management level. This course will furthermore prepare the student to undertake the role of maintenance manager through comprehension of maintenace manamement principles and tools commonly used within the industry.

Learning objectives

Maritime Law and Ship Administration - (SKF & SCH)

Maritime Law and Ship Administration III – SE1 (SKF & SCH) (46130):

In preparation for the role of master, the student must obtain the **knowledge** necessary to make qualified decisions on the below topics:

- Master's duties and responsibilities as representative of the shipowner, operator, charterer and cargo owner
- Crew management
- Salvage and towage agreements
- General average
- Marine insurance
- The ship owner's and charterer's insurance requirements and areas of cover under various policies
- Accident and average investigations
- Maritime lien and arrest
- Letters of protest and legal documentation
- Chartering and freight markets including legal and financial matters concerning ships' business
- Understanding the implications of letters of indemnity
- Chartering documents and their application
- Vessel management and the contractual obligations of the shipowner under commercial contracts
- The duties of the carrier under various limitation of liability regimes

The student must be capable of applying the above knowledge in order to obtain the following **skills**:

- Make qualified decisions on legal and commercial matters affecting the crew, shipowner, cargo owner, flag state, class society and insurers
- Gather evidence following accidents in order to secure the legal position of his employers, crew and interested parties
- Utilizing administrative knowledge in maintaining the vessel in a crew-worthy, seaworthy and cargo-worthy state
- Critically analyzing complex situations in order to protect the legal and commercial interests of the shipowner

- Manage the vessel's certificates
- Manage the vessel's Safety Management System
- Manage the vessel's ISPS and Ship Security Plan

The student must attain the necessary **competence** to:

- Write Masters' reviews
- Issue bills of lading on behalf of the shipowner and charterer
- Communicate correctly with external and internal entities on matters of legal and administrative matters

Leadership, Organization and Economics

Maritime Economics – SE1 (SKF & SCH) + SE3 (MCH) (46311):

The student must attain **knowledge** of:

- The market situation of a company
- The concept of sale, supply and demand and be able to account for those.
- Market types – and be able to account for the different models.
- The concepts of turnover - cost and the different types of cost.
- The concept of budgets
- The concept of balance and financial result

The student must attain the **skills** necessary to:

- The most important types of cost in managing a company or a ship
- How to minimize costs
- The financial situation of a company or a ship
- The situation of the maritime economy and market situation

The student must acquire the necessary **competences** to:

- Calculating financial key figures on basis of financial results
- Making simple analysis of company's financial situation
- Drawing up simple balance sheets and financial results
- Combining knowledge on economic conditions with practical problems and solutions
- Finding relevant information in order to a make simple market analysis

Human Resource Management – SE1 (SKF & SCH) (46332):

The student must attain **knowledge** of:

- Theories of motivation
- Management styles and models
- Strategic management
- Communication theory
- Conflict management
- Personality traits and tests
- Cultural theories
- Stress symptoms, causes and stress management

The student must attain the **skills** necessary to:

- Perform leadership in a multinational environment
- Communicate in a manner appropriate to the individuals concerned
- Manage conflicts
- Identify stress symptoms

- Ensure a satisfactory work environment
- Identify and understand organizational processes
- Understand an organization's strategy

The student must acquire the necessary **competence** to:

- Demonstrate effective leadership behaviors
- Communicate effectively
- Create and maintain good work relationships

Standard Based Tools – SE1 (SKF & SCH) + SE3 (MCH) (46341):

The student must attain **knowledge** of:

- Basic principles for standard based tools such as ISO 14001, ISO 9001, Danish Environmental Law, Marine environmental Law, SEEMP, EEDI and occupational Health and Safety.
- Quality assurance principles and auditing
- Basic quality assurance methods and auditing: plan-do-check-act principle
- GAP analysis
- Environmental management planning and audits at management level
- Common concepts of maintenance
- Methods used in testing materials in a non-destructive manner
- Maintenance standard requirements made by external interests, including class, insurance companies and authorities
- Common causes of vibrations in rotating machinery and common causes of hull vibrations

The student must attain the **skills** necessary to:

- Integrate occupational Health, Safety, Quality and Environmental management systems into the strategies of an organization
- Through reviews, identify areas for improvement and change within the quality assurance systems
- Implement changes and improvements within the quality assurance systems
- Apply maintenance management tools, including electronic maintenance control programs.
- Apply specific Non Destructive testing NDE- methods
-

The student must acquire the necessary **competences** to:

- Assist with coordinating Health, Safety and Environmental management
- Select the best-suited maintenance tools

Core literature

Maritime Law and Ship Administration:

- As per course literature lists

Maritime Economics:

- As per course literature lists

Maritime Organizational:

- As per course literature lists

Examination

Maritime Law and Ship Administration III – SE1 (SKF & SCH) (46300):

Examination type:	External, oral exam
Grade scale:	7-point scale
Preparation time:	24 hours
Duration:	30 minutes
Aids allowed:	None
Important Information:	Each student is randomly assigned a problem scenario by Wiseflow or the Study Services. The student prepares a 15-minute presentation of his/her conclusion. Subsequently the student will be randomly examined at master level in areas of the subject syllabus for the remainder of the examination.
Prerequisites for examination:	None

Maritime Economics SE1 (SKF & SCH)+SE3(MCH) (46311):

Examination type:	Ongoing assessment
Grade scale:	7-point scale
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for examination:	None

Human Resource Management – SE1 (SKF & SCH) (46332):

Examination type:	External oral exam
Grade scale:	7 point scale
Preparation time:	None
Duration:	30 minutes
Aids allowed:	All
Important Information:	At the beginning of the exam, each student draws a topic from a list of topics based on a case scenario, all known to the students as described in the lesson plan. For the first 10 minutes, the student addresses the topic. Subsequently, the student will be examined in other learning objectives of this subject
Prerequisites for examination:	None

Standard Based Tools SE1 (SKF & SCH)+SE3(MCH) (46341):

Examination type:	External oral exam
Grade scale:	7 point scale
Preparation time:	None
Duration:	20 minutes
Aids allowed:	All
Important Information:	At the beginning of the semester, the students receive a case scenario as described in the lesson plan. The student must hand in a case scenario report in accordance with the lesson plan. The examination is based on this case scenario report handed in by the student.
Prerequisites for examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**3-4-8000**	**Elective Subject (BJ & SE)**	
Subject(s):	88100	Elective Subject (BS, BM, **BJ** & **SE**)	
	88102	BTM & ERTM course (combined simulators) – SE(SKF+MCH+SCH)	2 ECTS
	88104	Docking - **BJ5+BJ6**+SE(SKF+MCH+SCH)	2 ECTS
	88105	Operational Optimization and Management Tools - **BJ6**+SE(SKF+MCH+SCH)	3 ECTS
	88108	Change Management – **BJ6**+SE(SKF+MCH+SCH)	3 ECTS
	88109	Negotiating Skills – **BJ6**+SE(SKF+MCH+SCH)	3 ECTS
	88110	Communication Skills – **BJ5+BJ6**+SE(SKF+MCH+SCH)	2 ECTS
	88111	Advanced Training for Liquefied Gas Tanker Cargo Operations - SE(SKF+MCH+SCH)	2 ECTS
	88115	Maritime Automation and IT - SE(MCH+SCH)	3 ECTS
	88117	Data Network for Automation Purpose - SE(MCH+SCH)	2 ECTS
	88119	PLC, Fieldbus and SCADA - SE(MCH+SCH)	2 ECTS
	88120	Project management – **BJ5**+SE(SKF+MCH+SCH)	2 ECTS
	88122	Pax-RoRo – **BJ5+BJ6**+SE(SKF+MCH+SCH)	2 ECTS
	88123	Robot I - Basic - SE(MCH+SCH)	2 ECTS
	88125	Shipping and chartering – **BJ5+BJ6**+SE(SKF+SCH)	2 ECTS
	88129	Advanced English – **BJ5+BJ6**+SE(SKF+MCH+SCH)	2 ECTS
	88130	Innovation and Entrepreneurship - SE(SKF+MCH+SCH)	6 ECTS
	88135	Advanced Polar Code Training - SE(SKF+SCH)	2 ECTS
	88140	Electrical Maritime Practice - SE(MCH+SCH)	2 ECTS
	88141	Energy Efficient Ship Operation - SE(SKF+MCH+SCH)	2 ECTS
	88142	How to Start a Business and Private Legislation SE(SKF +MCH+SCH)	4 ECTS
	88143	Globalization – **BJ5+BJ6**+SE(SKF+MCH+SCH)	2 ECTS
	88144	Offshore Support Operation -SE(SKF+SCH)	3 ECTS
	88145	Advanced Training for Oil & Chemical Tanker Cargo Operations - SE(SKF+MCH+SCH)	3 ECTS

Syllabus

Subject area:	**88000**	**Elective Subject (SE)**	
Subject(s):	88100	Elective Subject	
	88102	BTM & ERTM course (combined simulators) (**B**ridge **T**eam **M**anagement & **E**ngine **R**oom **T**eam **M**anagement)	2 ECTS
Admission criteria:	BTM	Passed Full Mission Bridge Simulator Course	
	ERTM	Passed Full Mission Engine Room Simulator Course.	
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	SE(SKF), SE(MCH) & SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on Ship Officer training programme – Danish order no. 1612 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW & US:	**BTM:** *STCW Code, as amended: Part A, chapter II - Master and deck department:* Section A-II/1 - Operational level Section A-II/2 - Management level *U.S. Government 33 CFR 157.415.* **ERTM:** *STCW Code, as amended: Part A, chapter II - Engine department* Section A-III/1 - Operational level Section A-III/2 - Management level		
Certificate(s):	Certificate Bridge Team Management. Certificate Engine Room Team Management.		
Responsible:	Subject Manager		

Syllabus

Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The course has the purpose to increase the students attention and knowledge as to how the human factor influences the safe conning of the ship as a total including the possibilities of ”near-miss” situations or casualties which may end in loss of life, property and/or environmental damage.
The course must train and develop the student’s ability within team management – providing tools for teambuilding, effective communication, functions in management, decision making and effective resource management.

Learning objectives

BTM & ERTM course (combined simulators) (88102):

Knowledge:

- Effective use of procedures and guidelines
- Effective use of all ships equipment in different situations

Skills:

- Effective reaction to changes and alarms/warnings
- Effective communication internally and externally
- Effective leadership and behavior
- Safe, correct and quick response to emergency situations
- Assertive behaviour
- Effective delegation of resources and workload
- Risk assessment of situations arising on the ship as a unit

Competencies:

- Effective conning of the vessel

Core literature

None

Syllabus

Examination

BTM & ERTM course (combined simulators) (88102):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**88000**	**Elective Subject (BJ)**	
Subject(s):	88100	Elective Subject	
	88104	Docking	2 ECTS
Admission criteria:			
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BJ5/BJ6 + SE(SKF) + SE(MCH) + SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	STCW Code, as amended: Part A, chapter II - Master and deck department Section A-II/1 - Operational level		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Syllabus

Purpose

The purpose of docking is for the student to attain knowledge about standard docking procedures and practices to acquire the necessary skills to communicate and cooperate with shipyard and classification society on an operational and management level.

Learning objectives

Docking (88104):

Knowledge:

- Class societies and flag state inspection intervals
- Ship plans including general arrangement, docking plan etc.
- Administrative aspects of docking including sharing of responsibility and accountability during docking with the ship yard and sub-contractors

Skills:

- Plan scheduled vessel docking
- Fulfill a docking specification
- Conduct hull and machinery inspections
- Supervise and test maintenance work
- Conduct daily communication, progress meetings etc. with the ship yard and subcontractors
- Coordinate docking with flag state administration, other authorities, classification societies, technical inspectors, insurance companies and other parties during docking
- Apply safe working practices

Competencies:

- Planning and execution of docking of a vessel
- Assess the work performed during docking

Core literature

None

Syllabus

Examination

Docking (88104):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88105	Operational Optimization and Management Tools	3 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BJ6 + SE(SKF) + SE(MCH) + SE(SCH)		
ECTS credits:	3		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Syllabus

Purpose

The objective of this course is to qualify the student to understand and use different optimizing- and management tools. Upon completion of the course, the student will gain the necessary knowledge, understanding, skills and competences to optimize workflows onboard and ashore.

Learning objectives

Operational Optimization and Management Tools (88105):

Knowledge:

- Management tools as LEAN, JIT, SIX SIGMA and KAIZEN.
- Operational optimization influence on organization and economy.

Skills:

- None

Competencies:

- Implement and use management tools to improve the organization's work environment, safety and economy

Core literature

None

Examination

Operational Optimization and Management Tools (88105):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88108	Change Management	3 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + BJ5/BJ6 + SE(SKF) +SE(MCH) + SE(SCH) BM8 (Specialization: Management) + BM8 (Specialization: Automation)		
ECTS credits:	3		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

This Change Management course will enable students to understand how they can carry out and implement any change in an organization, successfully. This course covers the basic theory within the change management theory. The course will give an introduction to different perspectives connected to organizational change. The main focus will be on change as a planned and managed process. Furthermore, there will be a discussion on the driving forces of change and how these - and their interpretations - may create different change processes.

Learning objectives

Change Management – BS5+BM8+BJ6+SE (88108)

Knowledge:

- How changes are initiated in organizations
- Different types of change
- The role and competences of change agents
- Management in organizations in change
- Organizational design and culture in relation to organizational change
- Communication process
- The role of leadership in planned change

Skills:

- Analyze a given organization and suggest changes
- Analyze and understand the basic aspects of organizational change; driving forces, content and context and process
- Understand the role of leadership in planned change processes, both possibilities and
- Work-out and implement a suitable strategy
- Finding innovative solutions to organizational change
- Understand the resistance in the organisation
- Understand how different cultures operate
- Identifiering Change Agents

Competencies:

- Work with different perspectives on organizational change, and how these perspectives relate to planned change
- Handle the basic strategies of change, and knowing under what contingencies they will work
- Handle the role of leadership in planned change processes, both possibilities and limitations
- Critically assess the possibility of planned change in different contexts.

Core literature

Following articles will be used from "Børsens Ledelseshåndbøger – Forandringsledelse":

2.4. Ledelse af forandringsprocesser – forandring eller forankring?
6.12. Forandringsledelse – Ledelsesadfærden skal afspejle den ønskede kultur
6.6. Værktøjer til forandringsledelse
2.12. Værktøjer til forandringsledelse
1.1. Introduktion
6.10. Forandringsprocesser
7.3. Coaching som strategiværktøj

Examination

Change Management – BS5+BM8+BJ6+SE (88108)

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88109	Negotiating Skills	3 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + BJ5/BJ6 + SE(SKF) + SE(MCH) + SE(SCH) BM8 (Specialization: Management)		
ECTS credits:	3		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

This negotiating skills course will enable students to understand how they can negotiate constructively with principals, colleagues, suppliers and contact negotiations and be able to carry out a negotiation, which creates a win-win outcome for all parties. This course covers all the basics of negotiating in a practical and interactive way.

Learning objectives

Negotiating Skills (88109):

Knowledge:

- Your values and how they impact on your negotiations.
- Understanding the nature of the gap between you and the other party.
- Styles and negotiators.
- Understand the structure underlying all negotiations.
- Identify the appropriate skills used in negotiations.
- Creating win-win negotiations.
- Preparing for a negotiation and setting objectives.
- Finding out as much as you can about the other party's needs and aspirations.
- Developing a strategy for success.
- Framing.
- Recognizing and dealing with 'underhand' tactics and manipulation.
- The importance of establishing a productive environment.
- Cross-cultural negotiations – understanding and dealing with different cultures.
- Understanding the meaning and importance of body language.
- Understanding the communication process.

Skills:

- Listening skills.
- Assertiveness - how to be assertive, but not aggressive, in negotiations.
- Questioning skills.
- Finding innovative solutions to objections.
- Summarizing and synthesizing skills.

Competencies:

- Open a negotiation.
- Conduct a negotiation both in English and in Danish.
- Handle objections.
- Question his or her negotiating partner.

Core literature

Forhandlingsteknik i teori og praksis af Anne Bay Nordtorp.

Examination

Negotiating Skills (88109):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE+Tutor)**	
Subject(s):	88100	Elective Subject	
	88110	Communication Skills	2 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + BJ5/BJ6 + SE(SKF) +SE(MCH) +SE(SCH) + Tutor BM8 (Specialization: Management)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE! eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The student will obtain knowledge, skills, and competences for planning, carrying out, and reflecting on the communication of a message by various means.

Learning objectives

Communication Skills (88110):

Knowledge:

- The basic terms of communication.
- The background of the participants/receivers.
- The effects of various means of communicating a message and the interaction between the sender and receiver of a message.

Skills:

- Plan and carry out the communication of a message by various means and to various target audiences.
- Choose the method to communicate a message.
- Use common technical means to communicate or present a message (e.g. presentation software, A/V equipment).

Competencies:

- Reflect on a communication course carried out.
- Estimate which means of communication would be appropriate in a given situation.
- Suggest adjustments based on the evaluation of a communication course.

Core literature

None

Examination

Communication Skills (88110):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88111	Advanced Training for Liquefied Gas Tanker Cargo Operations	2 ECTS
Admission criteria:	Passed Basic Training for Oil, Chemical & Gas Tanker Cargo Operations		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + SE(SKF) + SE(MCH) + SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	STCW Code, as amended: Part A, chapter V - Special training requirements Section A-V/1-2, paragraph 3 • Advanced training for liquefied gas tanker cargo operations as set in tablet A-V/1-2-2		
Certificate(s):	*Certificate of Advanced Training for Liquefied Gas Tanker Cargo Operations* is issued upon completion of the training programme prescribed in Regulation V/1-2, paragraph 4.3 of the STCW Convention of 1978, as amended and the Danish order on training programme for Tanker Operations and the Danish order no 1165 3. November 2014, as amended. Danish Maritime Authority *can issue Certificate of Proficiency in Advanced Training for Liquefied Gas Tanker Cargo Operations*, when experience of at least 3 months relevant seagoing service on a Gas Tanker is proved and completed the specialized training programme prescribed in Regulation V/1-2, paragraph 4 of the STCW Convention of		

	1978, as amended.	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The overall purpose is to enhance safety of liquefied gas tanker cargo operations on board liquefied gas tankers and thereby reducing the risk of injuries or death to crewmembers and preventing damage to the ship, the cargo and the environment. The course will provide the student the knowledge, skills and competences to safely perform and monitor cargo operations taking cargo hazards into account in relation to occupational health and safety and the environment in compliance with legislative requirements.

Learning objectives

Advanced Training for Liquefied Gas Tanker Cargo Operations (88111):

Knowledge:

- Liquefied gas tanker design, cargo systems and equipment including:
  - Types of liquefied gas tankers and cargo tank construction
  - General arrangement and construction
  - Cargo containment systems including materials of construction and isulation
  - Cargo handling equipment:
    - Cargo pumps and pumping arrangement
    - Cargo pipelines and valves
    - Expansion devices
    - Flame screens
    - Temperature monitoring systems
    - Cargo tank level gauging systems
    - Tank pressure monitoring and control system
  - Cargo temperature maintenance system
  - Tank atmosphere control system (inert gas, nitrogen) including storage, generation and distribution systems
  - Cofferdam heating systems
  - Gas detection systems
  - Ballast systems
  - Boil-off systems
  - Reliquefaction systems
  - ESD
  - Custody transfer system
  - Pump theory, different types of pumps and their operation
- Loading, unloading, care and handling of cargo including:

- The cargo's effect on trim, stability and structural integrity
- Application of cargo related operation plans, procedures and checklists for:
  - Post docking and loading including:
    - Tank inspection
    - Inerting
    - Gassing up
    - Cooling down
    - Loading
    - Deballasting
    - Sampling
  - Sea passage including:
    - Cooling down
    - Pressure maintenance
    - Boil-off
    - Inhibiting
  - Unloading
    - Unloading
    - Ballasting
    - Stripping and cleaning systems
    - Systems to make tank liquid free
  - Predocking preparations including:
    - Warm up
    - Inerting
    - Gas freeing
  - Ship to ship transfer

- Physical and chemical properties of noxious liquid cargoes including the MSDS and:
  - Chemical structure
  - Vapours:
    - Simple gas laws
    - States of matter
    - Liquid and vapour densities
    - Diffusion and mixing of gases
    - Compression of gases
    - Reliquefaction and refrigeration of gases
    - Critical temperature
    - Flashpoints
    - Compatibility, reactivity and positive segregation of gases
    - Polymerization
    - Saturated vapour pressure
    - Dew and bubblepoint
    - Lubrication of compressors
    - Hydrate formation
  - Liquid:
    - Properties of a single liquid
    - Nature and properties of solutions
    - Thermodynamic units
    - Basic thermodynamic laws and diagrams
    - Properties of materials
    - Effect of low temperature
- Hazards and the appropriate precautions to counter these during cargo operations including:

  - Flammability and explosion
  - Toxicity
  - Health hazards
  - Inert gas composition
  - Electrostatic hazards
  - Reactivity
  - Corrosivity
  - Polymerizing cargoes
  - Dangers of non-compliance with relevant rules and regulations
- Occupational health and safety including:
  - Safe work practices
  - Precautions when entering enclosed spaces
  - Repair work precautions including cold and hot work
  - Electrostatic precautions
  - Use of PPE including toxic gas monitoring equipment
  - Cold burn and frostbite
- Emergency procedures on board noxious liquid tankers
- Precautions to prevent pollution of the environment
- Legislative requirements concerning noxious liquid tanker cargo operations
- Industry requirements concerning oil tanker cargo operations

Skills:

- Planning of cargo operations with regards to:
  - Ship arrangement, cargo systems and equipment
  - Ship stability, trim and stress
  - Cargo properties and hazards
  - Application of occupational health and safety and safe working practices including risk assessment and personal shipboard safety relevant for oil tankers
  - Environmental and local legislative requirements
  - Industry guidelines
- Perform and monitor cargo operations and react appropriately on failure of systems or services essential to cargo operations
- Cargo measurements and calculations including liquid and vapour phase, on board quantity, remain on board quantity and boil-off calculations
- Manage and supervise personnel with cargo-related responsibilities
- Calibrate and use gas monitoring and detection systems and equipment
- Responds to emergencies according to MFAG and the SMPEP including ESD, rescue from enclosed spaces, emergency cargo valve operation and fire fighting
- Take precautions to avoid pollution of the atmosphere and the environment
- Monitor and control compliance with legislative requirements i.e. Marpol convention, IGC code, other relevant IMO guidelines, industry guidelines and commonly applied port regulations

Competencies:

- Conduct safe noxious liquid tanker cargo operations

Core literature

- SOLAS convention from IMO
- FSS code from IMO
- MARPOL convention from IMO
- IGC code from IMO
- IBC code from IMO
- ISGOTT
- Tanker Safety Guide – Liquefied Gases

Examination

Advanced Training for Liquefied Gas Tanker Cargo Operations (88111):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is higher than the level of learning objectives for the subject and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.
  and in accordance with the Danish order no. 1165 of 3 November 2014, as amended
- have practical experience on board liquefied gas tankers at management level and the instructor shall be
  - Associate professor at a maritime academy with specific theoretical and professional knowledge of liquefied gas tankers and their operations acquired as surplus officer on board a liquefied gas tanker
    or
  - Senior ships officer with minimum 2 years of experience on board liquefied gas tanker and trained in teaching.

Syllabus

Subject area:	**88000**	**Elective Subject (BM+SE)**	
Subject(s):	88100	Elective Subject	
	88115	Maritime Automation and IT	3 ECTS
Admission criteria:	BM: SE:	None None	
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BM8 + SE(MCH) + SE(SCH) BM8 (Specialization): Automation)		
ECTS credits:	3		
Course Regulations:	• Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Syllabus

Purpose

The student shall acquire a basic knowledge about TCP/IP automation network solutions in ships, so he/she can contribute and participate in making decision according to operation, purchasing and maintains of Bridge- and Cargo control systems.

Learning objectives

Maritime Automation and IT (88115)

Knowledge:

- Physical data-network components.
- Network protocols in maritime automation networks.
- TCP/IP diagnose software.
- Description and analysis of the need's for maritime automation solutions.
- Solving a practical task with consideration to safety, options, operation and maintenance so he/she are challenged to pursue problem solving that demonstrates independently innovative thinking and behavior.

Skills:

- Study technical literature and manuals in English.
- Use practical automation and network equipment components in the laboratory.

Competencies:

- Use of automation components communicating by TCP/IP network.
- Use of antivirus software.
- Preparation of specifications and evaluation of tender documents from suppliers.

Core literature

- Praktisk regulering og automation af Thomas Heilmann.
- TCP/IP- Bogen af Mose & Ferré.
- Literature on the internet and manuals for Software and technical information for the used equipment (share 75 %).

Examination

Maritime Automation and IT (88115):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BM+SE)**	
Subject(s):	88100	Elective Subject	
	88117	Data Network for Automation Purpose	3 ECTS
Admission criteria:	BM student: SE student:	None None	
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BM8 + SE(MCH) + SE(SCH) BM8 (Specialization: Automation)		
ECTS credits:	3		
Course Regulations:	• Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Purpose

The student shall archive basic knowledge about industrial IT solutions, so he can participate to make competent decisions within, purchasing, operating and maintenance.

Learning objectives

Data Network for Automation Purpose (88117):

Knowledge:

- Architecture of the internet.
- Network safety issue.
- Publishing of live data on the web.
- Demonstrate Innovative thinking in problem solving

Skills:

- Trouble shooting.
- Study manuals for equipment and technical literature in English language.
- Use of practical equipment components in laboratory to solve a problem, so he demonstrate independently thinking and behavior about solutions and options.

Competencies:

- After submission of this module it's the goal that the student are able to analyze and construct partially elements of an industrial data network system.
- Basic of TCP/IP Network

Core literature

- Articles and instructions manuals and technical literature according to the used equipment, (share: 85%).

Examination

Data Network for Automation Purpose (88117):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BM+SE)**	
Subject(s):	88100	Elective Subject	
	88119	PLC, Fieldbus and SCADA	2 ECTS
Admission criteria:	BM : SE:	None None	
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BM8 + SE(MCH) + SE(SCH) BM8 (Specialization: Automation)		
ECTS credits:	2		
Course Regulations:	• Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Purpose

After completion the independent student is able to analyze an automation task and configure set-up and program PLC equipment in a fieldbus network.

Learning objectives

PLC, Fieldbus and SCADA (88119):

Knowledge:

- Use of practical equipment components in laboratory to solve a problem, so he/she demonstrate independent innovative thinking and behavior in problem solving.
- Handling of safety and documentation according to European and International standards.
- Use of diagnostic tools and equipment for Profibus

Skills:

- **PLC:**
  - Select equipment on basis of information in datasheets, configure set-up in software and programming of PLC equipment.
  - Study manuals for equipment and other technical literature for used equipment in English language.
- **Fieldbus:**
  - Able to configure a PROFIBUS fieldbus system.
  - Able to trouble shooting in PROFIBUS fieldbus system networks.

Competencies:

- Working on Profibus fieldbus by; replacing, set-up new Profibus nodes and perform trouble shooting.

Core literature

- Manuals, technical literature for used equipment and software in English language.

Examination

PLC, Fieldbus and SCADA (88119):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88120	Project management	2 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BJ5/BJ6 + SE(SKF+MCH+SCH)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Purpose

The objective of this course is to qualify the student to understand and use generally project management tools. Upon completion of the course, the student will have ability and knowledge of the process and activity of planning, organizing, motivating, and controlling resources and procedures to achieve specific goals.

Learning objectives

Project management (88120):

Knowledge:

- Basic phases of Project management.
- Methods to achieve specific and measurable goals.
- Management planning and schedule tools like the Gantt chart.
- Roles in Project Management (project manager, project team, project owner).

Skills:

- Deal with scope, time, quality and budget of a project.
- Participate in a project team.

Competencies:

- Achieve the project goals and objectives.

Core literature

None

Examination

Project management (88120):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BJ+SE)**	
Subject(s):	88122	Pax-RoRo (2 ECTS)	
	88122-1	§5, Crisis management and crowd control (human behavior)	1½ ECTS
	88122-2	§7, Training in organization and execution of lifeboat and fire drills	½ ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BJ5/BJ6 + SE(SKF) + SE(MCH) + SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	*Annex to STCW Convention, as amended: Chapter V - Special training requirements:* Regulation V/2, paragraph 6 *STCW Code, as amended: Part A, chapter V - Special training requirements:* Section A-V/2, Paragraph 3, Crisis management and human behaviour training as set in table A-V/2 *Annex to STCW Convention, as amended: Chapter V - Special training requirements:* Regulation V/2, paragraph 7 *STCW Code, as amended: Part A, chapter V - Special training requirements:*		

	Section A-V/2, Paragraph 4, Passenger safety. Cargo safety and hull integrity training	
Certificate(s):	*Course Certificate of training for personnel on passenger ships and ro-ro passenger ships* is issued when 1. passed course §5, Crisis management and crowd control (human behavior) and 2. passed course §6, Passenger safety, cargo safety and hull integrity training and 3. passed course §7, Training in organization and execution of lifeboat and fire drills Credit transfer is given to Course §6, when a BS or BJ student has passed course Ship Technology III or a BM student has passed course Ship Technology and Docking for Marine Engineers. Order of a special qualification requirements, etc. for personnel on passenger ships – order no 391 of 22 April 2014, as amended	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

§ 5, Crisis management and crowd control (human behaviour):

The purpose of this part of the optional course is to let the student as ships officers or as responsible for the safety of passengers acquire the knowledge, skills and competences to handle the safety of passengers on board passenger ships in adverse and emergency situations.

§ 7, Training in organization and execution of lifeboat and fire drills:

The purpose of this part of the optional is to let the student acquire the knowledge, skills and competence to enhance the management of fire and boat drills including evacuation of passengers on board passenger ships.

Learning objectives

Pax-RoRo:

§5, Crisis management and crowd control (human behavior) (88122-1):

Knowledge:

- Emergency plans and procedures
- Leadership skills and stress handling
- Human behavior and responses
- The importance of clear and concise instructions and reports

Skills:

- Initial assessment of and providing an effective response to emergency situations in accordance with the established emergency procedures
- Ability to lead and direct others in emergency situations
- Ability to identify the development of symptoms of excessive personal stress
- Awareness of the general reaction patterns of people in emergency situations
- Ability to provide relevant information in emergency situations

Competencies:

- Organize shipboard emergency procedures
- Optimize the use of resources
- Control response to emergencies
- Control passengers and other personnel during emergency situations
- Establish and maintain effective communications

§7, Training in organization and execution of lifeboat and fire drills (88222-2):

Knowledge:

- Appropriate safety regulations concerning passenger ships' fire safety, evacuation and use of life saving appliances
- Importance of a common understanding regarding the importance of a thorough preparation and planning of all required drills
- Planning, preparation, execution and evaluation of fire fighting and evacuation drills

Skills:

- Include crisis management and crowd control into fire fighting and evacuation drills
- Heighten safety awareness when conducting fire fighting and safety drills.
- Enhance cooperation between the different personnel groups
- Motivation of personnel in conjunction with execution of drills
- Involvement of leading personnel in when planning, executing and evaluating drills

Competencies:

- Planning of fire fighting and evacuation drills
- Execution of fire fighting and evacuation drills
- Evaluation of fire fighting and evacuation drills

Core literature

None

Examination

§5, Crisis management and crowd control (human behavior) & §7, Training in organization and execution of lifeboat and fire drills (88122):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is higher than the level of learning objectives for the subject in accordance with the Danish order no. 391 of 22 April 2014
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BM+SE)**	
Subject(s):	88100	Elective Subject	
	88123	Robot I - Basic	2 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BM8 + SE(MCH) + SE(SCH) BM8 (Specialization: Automation)		
ECTS credits:	2		
Course Regulations:	• Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Syllabus

Purpose

The focus is to gain basic knowledge about robot technology with focus on autonomous robot.

Learning objectives

Robot I – Basic (88123):

Knowledge:

- To classify robots.

Skills:

- Qualified selection of sensors.
- Using practical equipment components in laboratory, so the student are challenged to problem solving and doing exercises that demonstrate independent thinking and behavior and dealing with options and solutions.
- Study literature and manuals for equipment's and software in English language.

Competencies:

- Design simple robot program for autonomous application.

Core literature

- International version of user manuals for equipment and other technical product information, in English
- Use of Help function in programming software, in English
- Agreement with the teacher

Examination

Robot I – Basic (88123):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88125	Shipping and chartering	2 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	**BS5 + BJ5/BJ6 + SE(SKF) + SE(SCH)**		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:	None		
Certificate(s):	None		
Responsible:	Subject Manager		
Valid from:	2021-1	VTA	
Expired:			
Remarks:	None		

Syllabus

Purpose

The objective of Shipping and Chartering is to qualify the student to fulfill the commercial obligations of a ship and shipowner when fixed on a charter party with due regard to securing the interests of his principals. These include the contractual terms of international commerce which affect the charter party and the shipments of cargo.
The participants will acquire a sound comprehension of shipping trade mechanisms, shipping market cycles, the freight, sale and purchase, newbuilding and demolition markets and ships' employment enabling them to comprehend the ship operator's choice of vessels employment. All lectures and course material will be presented in English.

Learning objectives

Shipping and chartering (88125):

Knowledge:

- The role of the owner, carrier, charterer, operator and broker in a chartering perspective.
- Chartering categories and hybrids.
- Contracts of carriage/affreightment and incorporated clauses.
- Choice of legal forum in chartering agreements.
- Deviation and liberty clauses.
- Documentary Credit System.
- Chartering abbreviations.
- The organization of the Shipping Market.
- Bunker strategy.
- Characteristics of shipping market cycles.
- Supply and Demand.
- Immediate, short and long term freight rate mechanisms.
- Key shipping indexes'.
- The freight market, the sale and purchase market, the demolition market and the new building market.

Skills:

- Understand chartering contract negotiations.
- Read and understand the content of standard charter parties.
- Understand the implications of standard abbreviations regarding laytime and demurrage.
- Understand key shipping indexes'.
- Identify whether a particular market is weak or strong based upon shipping newsletters.
- Link world events into a shipping context.

Competencies:

- Compute laytime and demurrage against a charter party.
- Issue letters of protest.

Core literature

Core literature for this course will be provided by the responsible lecturer.

Examination

Shipping and chartering (88125):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	Course participants may also pass this course by completing a 3 days internship at an approved shipping office. This must be approved by the course lecturer prior to commencement.
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88129	Advanced English	2 ECTS
Admission criteria:	The student should have demonstrated in a previous exam or in spoken and written tests the ability to speak and write English at the level 10 on the trini-scale or a level C1 on the Common European Scale for Languages (CEFR)		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + BJ5/BJ6 + SE(SKF) + SE(MCH) +SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

To enable the student to work as a Ships Officer or Master Engineer with a competence and ability in English so he/she can compete for jobs on sea or on land, conduct business in an international working environment, and carry out research and other enquiries in the maritime merchant sector.

Learning objectives

Advanced English (88129):

Knowledge:

- The language and vocabulary of job applications and interviews, human resources, qualifications and relevant personal experience.
- The language of technical reports, ordering supplies, communications with ship owners and charterers, and maintaining efficiency onboard.
- The language of environmental protection, emissions and the latest developments in these fields.
- The language of negotiating, diplomacy, and managing cultural differences.
- The language of planning, meetings, decision making and teamwork.
- Appropriate English for projects, surveys and research into maritime topics.

Skills:

- Write job applications and Curriculum Vitae to international companies.
- Conduct him/herself well in job interviews.
- Write letters and reports in relation to his job of Master or Chief Engineer.
- Analyze, advise and report on ship efficiency and environmental protection matters in English.
- Negotiate and use diplomacy in English when dealing with people of all ranks.
- Organize his/her own work and those of others in English.
- Carry out maritime research and surveys, and be familiar with project methodology language, in English.

Competencies:

- Act and speak with confidence in the modern international merchant shipping world.
- Communicate in writing to all major stakeholders.
- Complete research or projects in English which should be of a sufficient level to be published.

Core literature

Science Research Writing for non-Native Speakers, H.G.Glasman-Deal, 2014, Imperial College Press, UK

Examination

Advanced English (88129):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

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- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject (6 ECTS)	
	88130	Innovation and Entrepreneurship - Module I+II	5 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + SE(SKF) + SE(MCH) + SE(SCH) BM8 (Specialization: Management) + BM8 (Specialization: Automation)		
ECTS credits:	5		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:	None	

Purpose

The student should obtain skills, knowledge and competences in order to understand and work with the fundamental focus areas of Innovation and Entrepreneurship.

Learning objectives

Innovation and Entrepreneurship – Module I & II (88130):

Both module I and module II are based on student ideas and projects – therefore the precise content and perspectives are variable.
Both in module I and module II, the students are encouraged to participate in "Start-Up-Programme" by "FFE-YE"

Module I:

Knowledge:

- Idea generating. Idea generating techniques and methods.
- The fundamental parts of an innovation process
- The principles of effectual entrepreneurship

Skills:

- Identify market needs and perspectives
- Idea screening and development
- Simple idea descriptions and prototyping
- Oral and written pitching

Competencies:

- None

Module II:

Knowledge:

- Basic elements of a business plan
- Content of "Business Model Canvas"
- Basic Business Models

Skills:

- Strategic business development
- Causation and effectuation principles
- Evaluation of business ideas and models.
- Oral presentation

Competencies:

- Written Business Plan and presentation

Core literature

"Entreprenørskab i teori og praksis" – IDEA 2009
"Innovation" – Systime
"Effectual Entrepreneurship" – S. Sarasvathy
www.iværk.dk
www.amino.dk
www.startvækst.dk

Examination

Module I & II:

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS + SE)**	
Subject(s):	88100	Elective Subject	
	88135	Advanced Polar Code Training	2 ECTS
Admission criteria:	Passed Basic Polar Code Training		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS + SE(SKF) + SE(SCH)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended. • Order on training programme and certificates for service on ships operating in Polar Waters – Danish order no 762 of 11 June 2018, as amended.		
STCW:	*STCW Code, as amended: Part A, chapter V – Special training requirements* Section A-V/4 • Advanced training for ships operation in polar waters as set in table A-V/4-2.		
Certificate(s):	*Course Certificate in advanced training for service on Ships operating in Polar Waters* is issued upon completion of the training programme prescribed in Regulation V/4, paragraph 4 of the STCW Convention of 1978, as amended and the Danish order on training programme and certificates for service on ships operating in Polar Waters – order no 762 of 11 June 2018, as amended.. The Academy may issue a *Certificate of Proficiency in advanced training for service on Ships operating in Polar Waters*, when basic training for service on Ships operating in		

Syllabus

	Polar waters is passed and at least 2 months relevant seagoing service in polar waters is proved.	
Responsible:	Subject Manager	
Valid from:	2020-1	VTA
Expired:		
Remarks:	None	

Purpose

The purpose of Advanced Polar Code Training is for the student to gain the necessary knowledge, skills and competencies to perform the duties as master on board ships operation in polar waters in an efficient and safe manner whilst observing good seamanship.

Learning objectives

Advanced Polar Code Training (88135):
The student must obtain **knowledge** of:

- Reporting regimes in polar waters
- hazards associated with limited terrestrial navigational aids in polar regions;
- high latitude errors on compasses
- Understand icebreaker convoy terminology, and communications, and take icebreaker direction and move in convoy
- knowledge of different type of propulsion and rudder systems, including limitations to avoid damage when operating in ice;
- the use of heeling and trim-systems.; hazards in connection with ballast and trim in relation with ice

The student must acquire the **skills** necessary to:

- recognize the limitations of hydrographic information and charts in polar regions and whether the information is suitable for safe navigation
- perform passage planning deviation and modification for dynamic ice conditions
- identify limitations in discrimination of radar targets and ice-features in ice clutter
- Understand and recognize limitations of electronic positioning systems at high latitude
- Understand and recognize limitations in nautical charts and pilot descriptions
- Understand and recognize limitations in communication systems
- Prepare and conduct risk assessment before approaching ice including presence of icebergs, and taking into account wind, darkness, swell, fog and pressure ice
- Conduct communications with an icebreaker and other vessels in the area and with Rescue Coordination Centers

- Understand and describe the conditions for the safe entry and exit to and from ice or open water, such as leads or cracks, avoiding icebergs and dangerous ice conditions and maintaining safe distance to icebergs
- Understand and describe ice ramming procedures – including double and single ramming passage
- Recognize and determine the need for bridge watch team augmentation based upon environmental conditions, vessel equipment and vessel ice class
- Recognize the presentations of the various ice conditions as they appear on radar
- Understand methods to avoid besetment and to free beset vessel, and consequences of besetment
- Understand towing and rescue in ice, including risks associated with operation;
- Recognize conditions, which impact polar visibility and may give indication of local ice and water conditions, including sea smoke, blink and refraction.
- Understand the procedures and techniques for abandoning the ship and survival on the ice and in ice-covered waters
- Recognize limitations on fire-fighting systems and lifesaving appliances due to low air temperatures
- Understand unique concerns in conducting emergency drills in ice and low temperatures;
- Understand unique concerns in conducting emergency response in ice and low air and water temperatures

The student must acquire the **Competencies** necessary to:

- Develop a safe routing and passage planning to avoid ice where possible
- Handle the ship in various ice concentration and coverage, including risks associated with navigation in ice, and turning backing; avoidance; etc.
- Perform docking and undocking in ice covered waters, including hazards associated with operation and the various techniques to safely and undock in ice covered waters
- Anchoring in ice, including the dangers to anchoring system – ice accretion to hawse pipe and ground tackle

Core literature

- Ice Navigation in Canadian Waters", Icebreaking Program, Maritime Services, Canadian Coast Guard, Fisheries and Oceans Canada, Ottawa, Ontario (Revised August 2012)
- WMO Sea ice nomenclature (
- "Polar ship operations", The Nautical Institute
- "The Ice Navigation Manual" by Patrick R M Toomey, Michael Lloyd, David J. House, and David Dickins. Wither by Seamanship Publishers

Note: - Other publications deemed relevant pending regional requirements:

Antarctica

- Secretariat of the Antarctic Treaty (http://www.ats.aq/index_e.htm) for documents pertaining to Antarctic regulations, annexes and Madrid protocol

Canada

- Arctic Sailing Directions (ARC 400, ARC 401, ARC 402, ARC 403 & ARC 404)
- Arctic Waters Oil Transfer Guidelines
- Guidelines for the Operation of Passenger Vessels in Canadian Arctic Waters – TP 13670
- Manual of Standard Procedures for Observing and Reporting Ice Conditions (MANICE)

Denmark/Greenland

- PUB. 181 Sailing Directions (Enroute) Greenland and Iceland

Russia

- PUB 180 Sailing Directions (Planning Guide) Arctic Ocean

Bibliography (B)

- ABS Guide for vessels operating in low temperatures. (Dec 2009)
- Observers' Guide to Sea ICE (NOAA)
- Ice – Advice for Trading in Polar Regions (The Swedish Club)
- Admiralty Sailing Directions NP10 through 12 Arctic Pilot
- Baltic Ice Management Handbook

Antarctica

- PUB. 200 Sailing Directions (Planning Guide & Enroute) Antarctica

Videos - DVDs, CD ROMs, CBT's (V)

- NAVIGATING IN ICE (Videotel) (Code No. 927)

SAFE ESCORT (Canadian Coast Guard)

Examination

Advanced Polar Code Training (88135):

Examination type:	Ongoing assessment
Grading scale:	Passed or not passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

If conducting training using a simulator the instructor shall:

- have received appropriate guidance in instructional techniques involving the use of the simulator and
- have gained practical operational experience on the particular type of simulator being used

Syllabus

Subject area:	**88000**	**Elective Subject (BM + SE)**	
Subject(s):	88100	Elective Subject	
	88140	Electrical Maritime Practice (Maritime Electrical Installations and Switchboards, Documentation and Troubleshooting)	2 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BM8 + SE(MCH) + SE(SCH) BM8 (Specialization: Automation)		
ECTS credits:	2		
Course Regulations:	• Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	None	
Certificate(s):	None	
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:		

Purpose

Low voltage working at or near live electrical installations:
Competencies regarding work tasks and operation tasks at or near low voltage installations, with or without voltage in accordance with safety precautions regarding people, installations and operation.

Troubleshooting and circuit diagrams:
Competencies regarding troubleshooting in Maritime electrical equipment and systems based on circuit diagrams and function knowledge.

Construction and wiring of electrical switchboards:
Skills regarding construction, documentation and practical wiring of electrical switchboards

Electrical measurements:
Skills regarding measuring in electrical installations and safe handling of common instruments

Remarks:
The teaching methodology is mainly based on work shop principles regarding the troubleshooting tasks

Learning objectives

Electrical Maritime Practice (88140):

Knowledge:

- Security of necessary tools and equipment, measurement technique
- First Aid regarding electrical accidents
- Maritime Electro technical documentation

Skills:

- Safety management regarding electrical installations
- Preparation of documentation regarding risk assessment
- Operational skills regarding work at or near maritime low-voltage installations and systems, with or without live voltage

- Determination of functionality for electrical equipment, and documentation regarding main- and auxiliary circuit diagrams
- Operational skills regarding electrical measuring instruments
- Construction, documentation and wiring of electrical switchboards

Competencies:

- Operational competences within working at or near maritime low-voltage installations and systems, with or without live voltage in accordance with specified safety precautions for people, installations and operation
- Preparation of electrical documentation
- Troubleshooting in Maritime electrical installations

Core literature

- Power point
- Tasks and exercises (Moodle)
- Web -Automation: www.pcschematic.dk/skole

Examination

Electrical Maritime Practice (88140):

Examination type:	Ongoing assessment
Grading scale:	Passed/Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	Attendance is mandatory

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

7Subject area:	**88000**	**Elective Subjects (BS+SE)**	
Subject(s):	88100	Elective Subject	
	88141	Energy Efficient Ship Operation	2 ECTS
Admission criteria:			
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7, SE(SKF), SE(MCH) og SE(SCH).		
ECTS credits:	2 ECTS		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Dansih order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:			
Certificate(s):			
Responsible:	Subject Manager		
Valid from:	2021-1		
Expired:			
Remarks:			

Syllabus

Purpose

The purpose of the course is for the student to acquire knowledge of energy efficient ship operation, to obtain awareness and develop the skills to actively eco-drive available machinery and equipment under the prevailing conditions taking into account commercial aspects, regulation and safety.

Learning objectives

Energy Efficient Ship Operation (88141):

Knowledge:

- Ship energy efficient management and operation
- Energy optimization of ships – equipment, design, operation and maintenance
- Performance systems
- Data types, logged, manually collected and noon report
- Data collection, measurements and uncertainties
- Regulation EEDI, EEIO, SEEMP, IMO fuel data collection system and the EU MRV directive

Skills:

- Obtain and maintain awareness of energy efficient operation
- Interpretation of measured data from fuel consumption and running equipment
- Optimize performance based on performance data

Competencies:

- Handling complex situations balancing safety, time and energy efficiency
- Reflection on actions taken in balancing different or conflicting objectives
- Plan, perform and evaluate tests on board
- Ability to communicate and document the results of tests

Core literature

N/A

Examination

Energy Efficient Ship Operation (88141):

Examination type:	Ongoing assessment
Grading scale:	Passed/Not Passed
Preparation time:	N/A
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	A written report must be handed in as stated in the course plan

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88100**	**Elective Subjects (BS+BM+BJ+SE)**	
Subject(s):	88100	Elective Subject	
	88 142	How to Start a Business and Private Legislation	5 ECTS
Admission criteria:			
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + SE(SKF) + SE(MCH) + SE(SCH) BM8(Specialization: Management)		
ECTS credits:	5		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:		
Certificate(s):		
Responsible:	Subject Manager	
Valid from:	2021-1	
Expired:		
Remarks:		

Purpose

The purpose of this subject is to give the students an understanding of how to start a company. This subject will present methods and concepts that will help the student to select relevant assets and competencies and to develop strategies in branding, advertising, distribution, manufacturing and finance.

Learning objectives

How to Start a Business and Private Legislation (88142):

Knowledge:

- The 4 P's
- Industry and competitor analysis
- Consumer analysis and behavior
- Consumer in the marketplace
- Market analysis
- Environmental analysis
- Cost analysis
- Basic principles of commercial law
- Contracts when buying or selling

Skills:

- Develop an outline of a business plan for a new concept or business idea and analyze the same
- Asses the profitability and risk of a business model, including legal issues
- Understand the Contracts Act
- Understand the principles behind the Sale of Goods and Supply of Services Act (the Danish Sale of Goods Act)
- Understand the principles of liability law
- Apply knowledge of the Construction Act and AB92
- Apply knowledge of national and international private law
- Understand the principles behind insurance

Competencies:

- Evaluate the business value and feasibility of a new business idea or concept
- Prepare an outline of an implementation plan on how to start a new business based on a given business model

Core literature

N/A

Examination

How to Start a Business and Private Law (88142)

Examination type:	Ongoing assessment
Grading scale:	Passed/Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective subjects (BJ+BS+BM+SE)**	
Subject(s):	88100	Elective subject	
	88143	Globalization	2 ECTS
Admission criteria:			
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + BM8 + BJ5 + BJ6 + SE(SKF) + SE(MCH) + SE(SCH) BM8(Specialization Management)		
ECTS credits:	2		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:		
Certificate(s):		
Responsible:	Subject Manager	
Valid from:	2021-1	VTA
Expired:		
Remarks:		

Purpose

The purpose of this subject is to give the students an understanding of the globalization process. This subject will equip the students with some knowledge of the happenings in the field of economy, finance, culture and politics – with an emphasis on market and consumer behavior.

Learning objectives

Globalization (88143):

Knowledge:

- Globalization and the new global economy
- Continuity and change in the world economy since the 1970s
- Regional and multilateral agreements
- The field of economy, finance, culture and politics
- The development of new markets
- Consumer behavior and how it affects international trade and shipping
- Techniques on how to spot market opportunities
- The consequences of outsourcing

Skills:

- Understand the globalization process
- Understand the mechanism of international economic connections through which it works and an idea of some of the debates it has evoked
- Analyze market opportunities
- Reflect on how the maritime industry can explore market opportunities
- Reflect on different scenarios raised

Competencies:

- Critically evaluate and assess a market
- Critically evaluate global transformation

Core literature

N/A

Examination

Globalization (88143):

Examination type:	Ongoing assessment
Grading scale:	Passed/Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective subjects (BS+BM+SE)**	
Subject(s):	88100	Elective subject	
	88144	Offshore Support Operations	3 ECTS
Admission criteria:	None		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7 + SE(SKF) + SE(SCH)		
ECTS credits:	3		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2d for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		
STCW:			
Certificate(s):			
Responsible:	Subject Manager		
Valid from:	2021-1		
Expired:			
Remarks:			

Syllabus

Purpose

The purpose of the course is to let the participant acquire knowledge, skills and competences in operating offshore support vessels.

Learning objectives

Knowledge:

- Offshore Support Vessel types, common general arrangements and configurations
- Maneuvering and propulsive set-up and characteristics
- Introduction to Dynamic Positioning equipment and systems
- Legislative background for Offshore Supply Vessels (OSV) and Special Purpose Ships (SPS) vessels incl. IMO requirements in resolution MSC.415(97) for heavy lift at sea, anchor handling and towage
- Class requirements for crane operations and heavy lift at sea
- Anchor handling operations
- Subsea construction and ROV operations
- Ship-to ship and Ship-to-platform operations
- Towing operations
- Risk Assessment in offshore support operations
- 500m zone(bridging documents/permits for entry/precautions/risks/emergencies)

Skills:

- Utilize stability instruments to ensure safe heavy lift operations at sea

Competencies:

- Ship handling maneuvers:
  - Man over board from platform
  - Towage of another vessel
  - Ship to ship berthing

  Utilizing different maneuvering set-ups:
  - Twin propeller and thruster both ends
  - Twin Azimuth

Core literature

N/A

Syllabus

Examination

Offshore Support Operations (88144)

Examination type:	Ongoing assessment
Grading scale:	Passed/Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors or assistant professors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is the same or higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.

Syllabus

Subject area:	**88000**	**Elective Subject (BS, BM & SE)**	
Subject(s):	88100	Elective Subject	
	88145	Advanced Training for Oil and Chemical Tanker Cargo Operations	3 ECTS
Admission criteria:	• Passed Basic Training for Oil, Chemical & Gas Tanker Cargo Operations • BM students must have passed all subjects in BM2(Maritime Operations) (Subject area Work Experience: 21110, 21150, 21160, 21180, 21190 & 25425)		
Criteria to pass subject	These assessments make up the subject: 1. **None** assessment using the 7-point grade scale. • To pass the average of the assessments must be at least 2.0. (no rounding). 2. **One** assessment graded Passed/Not Passed. • This assessment must be graded Passed.		
Semester:	BS7, BM8(Maritime Operations), SE1 and SE2		
ECTS credits:	3		
Course Regulations:	• Master Mariner (BS) Version 5.80, 1 February 2021. • Marine Engineer (BM) Version 5.80, 1 February 2021. • Ship Officer (BJ+SE) Version 5.80, 1 February 2021.		
Orders:	• Order on the professional bachelor training programme for Master – Danish Order no. 1611 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Master - Danish order no. 1349 of 23 November 2018 as amended. This order is for students who were registered in BS1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Marine Engineer – Danish order no 1610 of 13 December 2016 as amended. • Order on the professional bachelor training programme for Marine Engineer - Danish order no. 1348 of 23 November 2018 as amended. This order is for students who were registered in BM1 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on the professional bachelor training programme for Ship Officer – Danish order no. 1612 of 13 December 2016, as amended. • Order on the professional bachelor training programme for Ship Officer - Danish order no. 1350 of 23 November 2018 as amended. This order is for students who were registered in BJ1, SE1 eller SE2 for first time in the spring of 2019 or later (2019-2, 2020-1 ect.). • Order on tests in the maritime training programmes – Danish order no 1585 of 13 December 2016, as amended. • Order on grading scale and other examination – Danish order no 114 of 3 February 2015, as amended.		

Syllabus

STCW:	*STCW Code, as amended: Part A, chapter V - Special training requirements:* Section A-V/1-1, paragraph 2 • Paragraph 2 Advanced training for oil tanker cargo operations as set in tablet A-V/1-1-2 Section A-V/1-1, paragraph 3 • Advanced training for chemical tanker cargo operations as set in tablet A-V/1-1-3	
Certificate(s):	*Course Certificate of Advanced Training for Oil Tanker Cargo Operations* is issued upon completion of the training programme prescribed in Regulation V/1-1, paragraph 4.3 of the STCW Convention of 1978, as amended and the Danish order no 1165 3. November 2014, as amended. *Danish Maritime Authority can issue Certificate of Proficiency in Advanced Training for Oil Tanker Cargo Operations* when experience of at least 3 months relevant seagoing service on an Oil Tanker is proved and completed the specialized training programme prescribed in Regulation V/1-1 paragraph 4 of the STCW Convention of 1978, as amended. *Course Certificate of Advanced Training for Chemical Tanker Cargo Operations* is issued upon completion of the training programme prescribed in Regulation V/1-1, paragraph 6.3 of the STCW Convention of 1978, as amended and the Danish order on training programme for Tanker Operations and the Danish order no 1165 3. November 2014, as amended. *Danish Maritime Authority can issue Certificate of Proficiency in Advanced Training for Chemical Tanker Cargo Operations* when experience of at least 3 months relevant seagoing service on Chemical Tankers is proved and completed the specialized training programme prescribed in Regulation V/1-1, paragraph 6 of the STCW Convention of 1978, as amended.	
Responsible:	Subject Manager	
Valid from:	2020-1	VTA
Expired:		
Remarks:	None	

Syllabus

Purpose

The overall purpose is to enhance safety of chemical and oil tanker cargo operations on board chemical and oil tankers and thereby reducing the risk of injuries or death to crewmembers and preventing damage to the ship, the cargo and the environment. The course will provide the student the knowledge, skills and competences to safely perform and monitor cargo operations taking cargo hazards into account in relation to occupational health and safety and the environment in compliance with legislative requirements.

Learning objectives

Advanced Training for Oil and Chemical Tanker Cargo Operations (88145):

Knowledge:

- Chemical and oil tanker design, cargo systems and equipment including:
  - Chemical and oil tanker
    - General arrangement and construction
    - Pumping arrangement and equipment
    - Slop management
    - Ballast systems
    - Fire-fighting systems
    - Cargo area venting and accommodation ventilation
    - Vapour recovery systems
  - Chemical tanker specifically
    - Tank construction and arrangement
    - Pipeline and drainage systems
    - Tank and cargo pipeline pressure and temperature control systems and alarms
    - Gas detection equipment
    - Cargo heating and cooling systems
    - Tank cleaning system
    - Cargo tank environment control
    - Tank, pipeline and fittings' material and coating
  - Oil tanker specifically
    - Tank arrangement, pipe system and tank venting arrangement
    - Gauging control systems and alarms
    - Cargo heating systems
    - Tank cleaning, gasfreeing and inerting systems
    - Electric and electronic cargo control systems
    - Environmental protection equipment incl. ODME
    - Cargo pressure and temperature control systems
  - Pump theory, different types of pumps and their operation
  - Tanker safety culture and SMS
  - Monitoring and safety systems including ESD
  - Monitoring procedures and safety systems initiating immediate action according to procedures for chemical tankers
- Loading, unloading, care and handling of cargo including:
  - The cargo's effect on trim, stability and structural integrity
  - Loading and unloading plans

    - Ballast and deballasting
    - Tank cleaning operations
    - Tank atmosphere control, inerting and gasfreeing
    - Specifically for oil tankers
        - COW
        - Load on Top
        - Ship to ship transfer
    - Specifically for chemical tankers
        - Inhibition and stabilization requirements
        - Heating and cooling requirements and consequences to adjacent cargo
        - Cargo compatibility and segregation
        - High-viscosity cargoes
        - Cargo residue operations
        - Operational tank entry
- Physical and chemical properties of noxious liquid and oil cargoes including the MSDS chemical cargo information and:
    - Chemical cargoes categories (corrosive, toxic, flammable and explosive)
    - Chemical groups and industrial usage
    - Reactivity of cargoes
- Hazards and the appropriate precautions to counter these during cargo operations including:
    - Flammability and explosion
    - Toxicity
    - Health hazards
    - Inert gas composition
    - Electrostatic hazards
    - Reactivity
    - Corrosively
    - Low boiling point cargoes
    - High density cargoes
    - Solidifying cargoes
    - Polymerizing cargoes
    - Dangers of non-compliance with relevant rules and regulations
- Occupational health and safety including:
    - Safe work practices
    - Precautions when entering enclosed spaces
    - Repair work precautions including cold and hot work
    - Electrostatic precautions
    - Use of PPE
- Emergency procedures on board chemical and oil tankers
- Precautions to prevent pollution of the environment
- Legislative requirements concerning chemical and oil tanker cargo operations
- Industry requirements concerning chemical and oil tanker cargo operations

Skills:

- Planning of cargo operations with regards to:
    - Ship arrangement, cargo systems and equipment
    - Ship stability, trim and stress
    - Cargo properties and hazards
    - Application of occupational health and safety and safe working practices including risk assessment and personal shipboard safety relevant for chemical and oil tankers

  - Environmental and local legislative requirements
  - Industry guidelines
  - Perform and monitor cargo operations and react appropriately on failure of systems or services essential to cargo operations
- Cargo measurement and calculations
- Manage and supervise personnel with cargo-related responsibilities
- Calibrate and use gas monitoring and detection systems and equipment
- Responds to emergencies according to MFAG and the SOPEP/SMPEP including ESD, rescue from enclosed spaces and fire fighting
- Take precautions to avoid pollution of the atmosphere and the environment
- Monitor and control compliance with legislative requirements i.e. MARPOL convention, IBC code, other relevant IMO guidelines, industry guidelines and commonly applied port regulations

Competencies:

- Conduct safe chemical and oil tanker cargo operations

Core literature

- SOLAS Convention
- MARPOL Convention
- FSS Code
- IBC Code
- ISGOTT
- Tanker Safety Guide - Chemicals
- CHRIS Manual

Examination

Advanced Training for Oil and Chemical Tanker Cargo Operations (88145):

Examination type:	Ongoing assessment
Grading scale:	Passed or Not Passed
Preparation time:	None
Duration:	N/A
Aids allowed:	N/A
Important Information:	None
Prerequisites for Examination:	None

Qualification prerequisites for professors/instructors etc.

Associate professors, assistant professors or instructors intended to be used in qualifying for certification under the STCW convention of 1978 as amended shall:

- have a qualification level that is higher than the level of learning objectives for the subject
  and
- have a full understanding of the subject-training programme and the specified objectives for each type of training being conducted.
  and in accordance with the Danish order no. 1165 of 3 November 2014, as amended
- have practical experience on board tankers at management level and the instructor shall be
  - Associate professor at a maritime academy with specific theoretical and professional knowledge of chemical and oil tankers and their operations acquired as surplus officer on board a chemical and oil tanker
    or
  - Senior ships officer with minimum 2 years of experience on board chemical and oil tankers and trained in teaching.