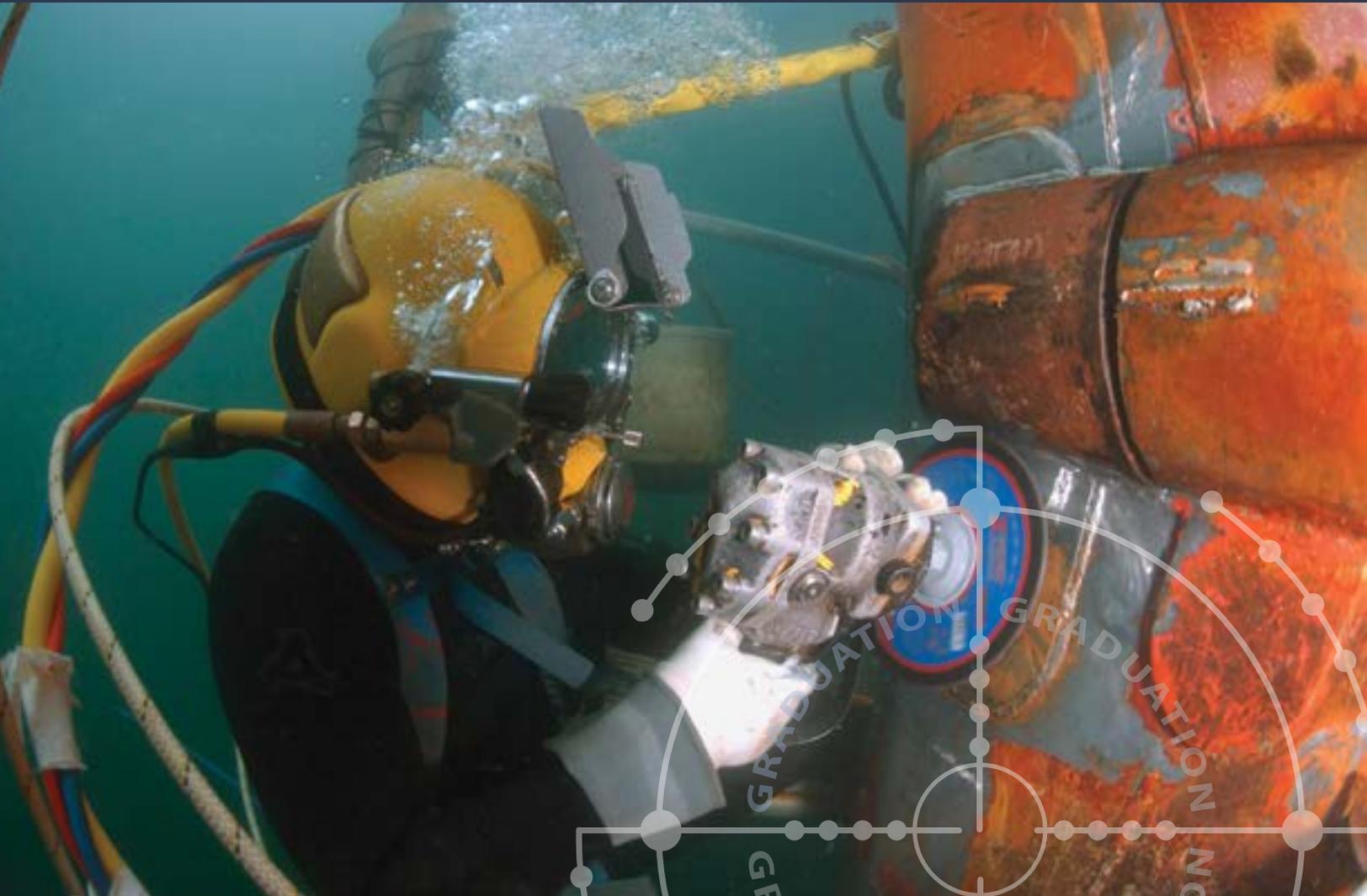


CAREER ZONE: MARINE

Helping High School Students Prepare for a Career in the Marine Sector

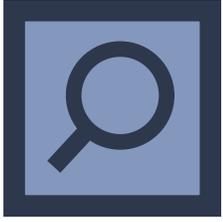


Ministry of
Education

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THIS GUIDE

This guide provides general background on the British Columbian marine sector, followed by more specific information on the four primary marine sub-sectors.

It also includes sample bundles of high school and post-secondary courses and training that illustrate how high schools, post-secondary institutions and industry partners and employers may work together to develop pathways individual students can follow to qualify for a career in the marine sector.

This guide is an *introduction* only to the job and career possibilities within this sector. More detailed information is available from a variety of general and sector-specific sources mentioned throughout this guide.

WHAT IS A CAREER ZONE?

A Career Zone is a group of courses, certifications and work opportunities that BC high schools can develop to help Grade 11 and 12 students get ready to pursue a career in a particular industry while meeting provincial graduation requirements.

By working within a Career Zone in high school, students have the opportunity to:

- select the courses that match their specific skills, interests and career goals
- complete the pre-requisites of the post-secondary certificate, diploma or degree program of their choice
- take dual credit courses for a career head start and gain valuable post-secondary experience
- obtain industry-recognized career-preparation certifications
- acquire work experience relevant to their career goals





WHAT'S INCLUDED IN A CAREER ZONE?

A Career Zone includes a broad range of core courses and career-specific electives, industry-recognized certifications and work experience intended to prepare students for the careers they want while they are still in high school.

Individual BC School Districts are encouraged to develop their own Career Zones based on local labour market needs, student interests, industry and post-secondary partnerships, and local work experience opportunities.

Career Zones should include:

- mathematics, language arts and science courses at the Grade 11 or Grade 12 level
- an applied skills elective at the Grade 11 or Grade 12 level
- where available, a variety of transition opportunities, including:
 - » dual credit courses
 - » Board/Authority Authorized (BAA) courses
 - » Independent Directed Studies
 - » Advanced Placement courses
 - » Work Experience 12A and 12B, as well as other workplace training opportunities, including co-op placements and summer internships
- industry-recognized career-preparation certifications, such as CPR, First Aid or Workplace Hazardous Materials Information System (WHMIS)

IS THERE ONLY ONE ROUTE WITHIN A CAREER ZONE?

Depending on their specific career goals, graduating students have a choice of four basic routes:

- apprenticeship route
- certificate or diploma route
- degree route
- direct-to-work route



INDUSTRY TRAINING AUTHORITY PROGRAMS

Youth [Train in trades \(TRN\)](#) allows high school students to take first level (classroom) technical training in a trade and receive credit for both high school and the apprenticeship. Technical training classes are most often taught at post-secondary institutions but can also be offered at school district facilities.

Youth [Work in trades \(WRK\)](#) lets students begin the work-based training component of an apprenticeship program while still in high school. Students “earn while they learn,” earning credits toward both their high school diploma and apprenticeship on-the-job training. WRK students complete up to 480 hours of work experience that counts toward their apprenticeship.

Apprenticeship Route

This route helps prepare students to apprentice in a trade as soon as they graduate.

An apprenticeship is a combination of:

- work-based training:
 - » 20% in school
 - » 80% on a work site, with an employer sponsor
- classroom learning at a college, institute, university or private trades training institution

All apprenticeship training is delivered by skilled, certified trades people with experience in the field.

In BC, successful apprenticeship training leads to a Certificate of Qualification (CoQ) awarded by the **INDUSTRY TRAINING AUTHORITY**, which is recognized across the province. About 50 trades also offer the Interprovincial (IP) Red Seal certificate, which is recognized across Canada.



Certificate or Diploma Route

The certificate or diploma route helps prepare students who have decided to pursue a career that requires fairly extensive additional training after high school graduation. This training requires a minimum of 13 weeks and usually one to two years, depending on the structure of the program and the institution.

Many certificate or diploma programs in BC allow students to move into an advanced-level degree program in the same subject area.



Degree Route

The degree route helps prepare students for a career that requires a four or five year degree from a post-secondary institution.

Some degree programs begin in one institution and are completed at another.

Direct-to-Work Route

Graduates who have the right preparation in high school have many direct-to-work job opportunities in the marine sector. These jobs require only on-the-job training and the appropriate industry-recognized career-preparation certifications. Students may be able to acquire these certifications while still in school or within a very short time after graduation.

Some jobs may require additional certificates that take a little longer to complete.

The direct-to-work route includes an option to enter the workforce immediately upon graduation or after a short certificate program taking 12 weeks or less.

IS IT POSSIBLE TO CHANGE A ROUTE?

It is always possible to change a route.

A Career Zone provides students with a solid foundation of core courses, electives, career-preparation certificates and work experience relevant to a particular industry—in this case, the marine sector—that can be adapted to different routes as required.

NOT ALL INDUSTRY JOBS ARE IN THE FIELD

In addition to skilled and experienced people who work in the field or on the front lines, every industry needs people who work in the office, in such areas as IT, accounting, health and safety, human resources, investor or customer relations, communications, etc. While general certificates and degrees are available in these fields, it can help to have relevant courses, certifications and work experience within the industry sector.

Every industry also needs leaders: business managers, supervisors, executives. Many people occupying leadership roles start by first gaining relevant work experience then adding further on-the-job training, additional certifications or advanced degrees.

For example, a student may start on the apprenticeship route, then realize, as he or she learns and experiences more, that the post-secondary certificate or degree route would be better. The student can then add the additional courses, career-preparation certificates or work experience needed for that route.

A Career Zone helps enable students to make changes later, when they are already in a training program or the workforce. With the broad based, career-focused foundation they receive in high school, they will find it easier to upgrade their qualifications later.

Students and their parents should be open to the possibility that an inspiring course or a stimulating work experience may lead them to change their original career path.



USEFUL CAREER PLANNING RESOURCES

- [WORKBC](#) provides profiles of more than 500 different occupations, with details on job duties, education and training required, employment outlook and average salaries or wages. The site also offers a comprehensive database of BC job postings and a blog featuring trends, job-search tips and employment programs.
- [EDUCATION PLANNER BC](#) allows users to compare BC post-secondary programs.
- [TRADES TRAINING BC](#) helps students and employers find trades programs offered at 14 post-secondary institutions throughout BC.
- [ITABC](#) works with employers, employees, industry, labour, training providers and government to issue credentials, manage apprenticeships, set program standards and increase opportunities in the trades.
- [DISCOVERSKILLSBC](#) includes information about apprenticeships and careers in technology and resources to help students discover which trades are a good match for them.
- [WE ARE SHIPBUILDERS](#) provides information on career options and opportunities in British Columbia's shipbuilding and ship repair industry.

CAREER ZONE MAP

Like a transit map, the chart on the next page shows four possible routes from high school to a range of the most in-demand careers in the marine industry.

Career Zone Map: Marine

This map shows the various routes high school students can take to achieve high-demand jobs in the marine sector.

Routes start from the centre, with core high school courses, followed by options that help prepare students for the next steps along the route of their choice.

At any point, students may decide to switch their direction of travel and try a different route.

Bold indicates a high-demand job (*BC 2025 Labour Market Outlook*)



MARINE CAREERS

British Columbia's extensive 26,000 kilometres of coastline and many lakes and rivers mean that the marine industry is a major economic force in this province, offering great job prospects—not only at sea, but also on land.

In addition to working onboard a vessel, whether a tugboat, private yacht, ferry, or navy frigate, the marine industry also includes (but is not limited to):

- design and construction, from kayaks, canoes and sailboats, to tankers and aircraft carriers
- refit and repair
- sales, ship brokering, and charter services
- operations management
- project management
- port and terminal operations
- recreational boat marinas and yacht service operations
- ocean research and specialized technology—such as marine robotics—developed as a result of ocean research
- marine environmental protection
- marine instrument, systems, and equipment design and manufacturing, including:
 - » electronic navigational devices
 - » communication equipment
 - » radar and sonar
 - » subsea vehicles
 - » undersea imaging equipment
- marine logistics and support
- marine regulatory management
- marine safety
- marine surveying

FOR MORE INFORMATION:

[BC Labour Market Outlook](#)

[Association of British Columbia Marine Industries](#)

[BC Marine Service Industry](#)

FACTS AND FIGURES

- **74%** of the world's trade is carried by ship.
- Shipbuilding and ship repairing—including naval vessels and ferries—in BC will receive an estimated **\$10 billion** in new investment over the next few years.
- BC's growing recreational marine industry employs **thousands** of highly skilled technicians in communities on the coast and across the province.
- The Canadian Coast Guard responds to over **6,000** calls for marine assistance per year, saving a life every 100 minutes.





RECOMMENDED CORE COURSES AND ELECTIVES FOR CAREERS IN THE MARINE SECTOR

It is vital that students investigate the core courses and electives that will help them take the most direct route to the career they want in the marine sector.

Core Courses

All BC high school students are required to take core courses in language arts, mathematics, social studies, and science for graduation. But, in each core subject area, there are options that make it easier to go directly to work or to enter the post-secondary training program of their choice. .

For example, students are required to complete a Language Arts 12 course to graduate, but they do not have to take a Mathematics 12 course. This means they need to pick their Mathematics 11 course (or courses) carefully to fulfill the pre-requisites of any post-secondary training they want to pursue. For instance, an apprenticeship might require Workplace Mathematics 11 or Foundations of Mathematics 11. Some post-secondary programs might require Pre-Calculus 11, while others also ask for Pre-Calculus 12.

Electives

Choosing the right electives is as important as choosing the core courses. For example, students wanting to apprentice as electricians need Physics 11.

All students, including those who intend to go direct-to-work without any additional training, will benefit significantly from gaining skills and work experience directly applicable to jobs in the marine sector.

GRADUATION PLANNING RESOURCES:

[Graduation Planner](#)

[Graduation Requirements](#)

DUAL CREDIT OPTIONS

Dual credit courses (counted as elective credits) give BC high school students the opportunity to earn both high school and post-secondary credits at the same time.

Several BC school districts, in collaboration with a local post-secondary institution, offer dual credit options that might be of benefit to students interested in the marine sector. Check with your school district..

In addition, there are a number of courses available as electives that would be valuable for students interested in marine careers, for example:

- for all students interested in the design, engineering, or building aspects of the marine industry:
 - » Drafting 11/12
 - » Electronics 11/12
 - » Engine and Drivetrain 12
 - » Machining and Welding 12
 - » Mechatronics 12
 - » Metalwork 11/12
 - » Robotics 11/12
 - » Woodwork 11/12
 - » Furniture and Cabinetry 12
- for students interested in the business side of the marine industry:
 - » Accounting 11/12
 - » E-Commerce 12
 - » Entrepreneurship 11
 - » Marketing and Promotion 11
- for students interested in the ocean research/environmental aspects of the marine industry:
 - » Chemistry 11/12
 - » Earth Sciences 11
 - » Environmental Science 11/12
 - » Geology 12
- all students should also consider:
 - » relevant dual credit courses or locally developed Board/ Authority Authorized (BAA) courses, where available, such as Civil Engineering Concepts, project management, project planning and communications
 - » Work Experience 12A and 12B
- students interested in an apprenticeship should consider:
 - » Youth Explore Skills Trades/Youth Explore Skills Trades Sampler
 - » [Train in Trades \(TRN\)](#), and
 - » [Work in Trades \(WRK\)](#)

WORK EXPERIENCE 12A AND 12B

In Work Experience 12A and 12B, each 100 to 120 hours long, the community is the classroom. Work site placements help prepare students for the transition from high school to the world of work by providing opportunities to gain valuable workplace knowledge, determine (or change) career goals, and develop job skills.

To find out more, see the [Program Guide for Ministry Authorized Work Experience Courses](#).





RECOMMENDED CAREER PREPARATION CERTIFICATES FOR CAREERS IN THE MARINE SECTOR

Most marine sector companies require applicants to have at least a high school diploma. Acquiring relevant career-specific certificates can also ensure that students have a better chance of employment, or perhaps a higher level of employment, directly out of high school, college, university, or other private or public post-secondary training.

Certifications can take anywhere from a couple of hours to several weeks to complete. Useful **safety** certifications include:

- Occupational First Aid Levels 1, 2, & 3
- CPR
- Confined Space Awareness
- Construction Safety Training System
- Fall Protection
- Marine Basic or Advanced First Aid
- Marine Emergency Duties, such as:
 - » Domestic Vessel Safety
 - » Basic Safety
 - » Survival Craft and Rescue Boat
 - » Advanced Fire Fighting
- Workplace Hazardous Materials Information System (WHMIS)

Other certifications, depending on your job interests within the marine industry, include:

- Aerial Lift Platform, including boom and scissor lift
- Boating 1 (Pleasure Craft Operator Card)
- Forklift Awareness
- FOODSAFE Level 1
- Maritime Radio Operator, including:
 - » Restricted Operator Certificate – Marine
 - » Restricted Operator Certificate – Maritime Commercial
- Sailing, including Sail Canada certifications for handling:
 - » dinghies
 - » windsurfers

- » powerboats
- » keelboats
- » navigation
- Small Vessel Operator Certificate
- Serving It Right

Please note:

- Some certifications are time-limited. For example, a CPR certificate is valid for three years only, then the person must re-certify. It is a good idea for high school students to complete or renew their certifications close to graduation.
- The marine sector also recommends students consider having a [Seafarer's Medical](#) exam by a Transport Canada-approved doctor to ensure that they are physically able to undertake employment in the marine industry.
- Some employers require specific entry-level certificates: For example, Seaspan—a major marine employer in BC—requires all employees to have:
 - » a valid Transport Canada Medical Certificate
 - » Marine Emergency Duties – Basic Safety Training
 - » Marine Emergency Duties – Survival Craft and Rescue Boat
 - » FOODSAFE Level 1
 - » Marine Basic First Aid



Photo: Seaspan





MARINE SUB-SECTORS

The marine industry is one of BC's largest and most vital industries. It is also one of the most diverse, encompassing a broad range of jobs. Some of these jobs call for minimal training; others demand distinct skills. Many tradespeople—such as carpenters or electricians who have worked in construction, for example—transfer into the marine industry and apply their skills in new ways.

For the purposes of this guide, we have divided the marine sector into four sub-sectors:

- **Design and Build It**
 - » the jobs involved in designing and manufacturing ships, large and small
- **Sail It**
 - » the jobs involved in moving ships from place to place at sea
- **Support It**
 - » the jobs involved in providing on-land support services to the marine industry, including ship repair
- **Protect It**
 - » the jobs involved in ensuring the safety of ships and their crews, and to protect our lakes, oceans, coastlines, seas, and wildlife



Photo: Seaspan

MARINE SUB-SECTOR PROFILE #1: DESIGN AND BUILD IT

Whether it's a massive navy destroyer or a mid-size cruise ship, an ocean-going barge or a river tugboat, an urban water taxi or 100-foot recreational sailboat, all ships need to be designed and built. This work is done in a variety of facilities, from major shipyards to small marinas.

The chart below divides **Design and Build It** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



DESIGN AND BUILT IT POSSIBILITIES

Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Architectural Sheet Metal Worker • Boilermaker • Carpenter • Diesel Engine Mechanic • Electrician, Industrial • Electrician, Marine (Electrician with a Marine Endorsement) • Inboard/Outboard Engine Mechanic • Industrial Mechanic (Millwright) • Heavy Duty Equipment Mechanic • Instrument and Control Technician • Marine Mechanical Technician • Marine Service Technician – see Sample Bundle 1 for a possible route to this career • Metal Fabricator (Fitter) • Painter • Parts and Warehousing Person • Pipefitter • Plumber • Welder <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Cabinet Maker • Ironworker • Glazier • Refrigeration and Air Conditioning Mechanic • Steamfitter/Pipefitter 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate



Route:	Job Possibilities:	Possible Credentials:
<p>Certificate or Diploma</p>	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accounting Technician and Bookkeeper • Administrative Assistant • Contractors and Supervisors, Carpentry Trades • Construction Inspectors • Drafting Technologist or Technician • Electrical and Electronics Engineering Technologist or Technician • Electronics Technician • Marine Engineer • Project Manager • Project Coordinator <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Civil Engineering Technologist or Technician • Construction Estimator • Estimator • Planner • Purchaser • Expeditor • Junior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Quality • Safety Attendant 	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Business Administration Diploma • Certificate in Aluminum Boat Building • Computer Aided Design and Drafting Diploma • Marine Engineering Diploma • Nautical Sciences Diploma of Technical Studies • Project Management Associate Certificate • Project Management Professional Certificate (PMP)



Photo: Seaspan

Route:	Job Possibilities:	Possible Credentials:
Degree	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accountant • Engineer: <ul style="list-style-type: none"> • Civil • Electrical and Electronics • Marine • Mechanical • Naval Architect • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Advertising, Marketing, and Public Relations • Computer and Information Systems • Financial • Supply Chain <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Lawyer • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Project • Quality • Sales 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Commerce • Bachelor of Engineering • Bachelor of Science • Bachelor of Technology in Manufacturing <p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications and/or • a master's degree
Direct-to-Work	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Boat Canvas Fabricator • Marine Painter/Finisher • Marine Upholsterer • Marketing/Salesperson • Receptionist • Truck Driver • Yard labourer <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Cleaner • Janitor 	<p>On-the-job training is available for many marine sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Certificate in Sales and Marketing • Heavy Equipment Operator Technician Certificate • Truck Driver Certificate



ABOUT BECOMING A MARINE ELECTRICIAN

Apprentice electricians can choose to take additional training—over and above the training required to be a Construction or Industrial Electrician—that applies specifically to the marine sector. This additional training leads to what's called a "Marine Endorsement."

A Marine Electrician understands electrical installation and maintenance of electrical equipment in a marine environment and is responsible for the safe operation and distribution of AC and DC electrical power to the various ship systems. Marine Electricians apply and install transits, cabling, and terminations, interpret marine electrical drawings, interpret and apply marine codes and regulations, and use test equipment for troubleshooting ship systems



MARINE SUB-SECTOR PROFILE #2: SAIL IT

All ships are meant to move, and they all require crews with a range of skills to do it, from master (captain), to engine mechanic, to deckhand.

For more about marine careers at sea, visit:

- [EducationPlannerBC](#)

Step 1: Training

Step 2: Transport Canada Certificate of Competency

Transport Canada's [Marine Safety Branch](#) oversees seafaring training programs in Canada.

Once a student successfully completes a Transport Canada-approved program and meets the requirements of Transport Canada, including obtaining experience at sea, the student will receive a Certificate of Competency. With that certificate, the student is eligible to work on Canadian seafaring vessels. There are more than 90 professional certificates available, such as Certificate of Competency as Master Mariner, Second Mate, Fishing Master, or Watchkeeping Mate.

A Candidate Document Number (CDN) is required by Transport Canada prior to issuing a certificate. It is strongly recommended that students contact Transport Canada and [obtain a CDN](#) prior to taking a seafaring course.

The following chart divides **Sail It** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



SAIL IT POSSIBILITIES

Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Diesel Engine Mechanic • Electrician, Industrial • Electrician, Marine (Electrician with a Marine Endorsement) • Heavy Duty Mechanic • Marine Mechanical Technician • Marine Service Technician – see <i>Sample Bundle 1 for a possible route to this career</i> • Professional Cook 1, 2, and 3 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Chief Engineer • Chief Mate – see <i>Sample Bundle 2 for a possible route to this career.</i> • Deck Officer • Electronics Technician • First Engineer • Fishing Master • Marine Cook • Marine Engineering Officer • Master (Captain) • Watchkeeping Engineer • Watchkeeping Mate 	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Chief Mate Near Coastal Certificate • Engine Room Rating Certificate • First Class Motor Certificate • Fishing Master Certificate • Marine Engineer Diploma • Master Mariner Certificate • Master 150GT or 500T Domestic Certificate • Nautical Sciences Diploma • Small Vessel Machinery Operator Certificate • Watchkeeping Mate Near Coastal Certificate
Direct-to-Work	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Bridge Watch/Deckhand – see <i>Sample Bundle 4 for a possible route to this career.</i> • Watchkeeping Mate • Charter • Clerk/Storekeeper • Kitchen Assistant • Steward <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Powerboat Instructor • Sailing/Cruising Instructor 	<p>On-the-job training is available for many marine sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Bridge Watchman Certificate • Camp Cook Assistant Certificate • Hospitality Certificate • Marine Basic and Marine Advanced First Aid • Restricted Operator Certificate - Maritime Commercial • Small Vessel Operator Proficiency <p>The BC Sailing Association offers instructor certification courses for power and sail.</p>





MARINE SUB-SECTOR PROFILE #3: SUPPORT IT

Many professions support the marine industry from dry land (or docks) located in:

- ports and terminals including:
 - » longshore workers who load and unload cargo
 - » parts workers who handle the movement and storage/warehousing of goods
 - » planners and logistics specialists
 - » property managers
 - » environmental managers
 - » communication and community relations liaisons
- shipyards, marinas, and specialty marine service centres, including the workers who:
 - » repair ships, sails, and engines
 - » manage large dry docking facilities
 - » liaise with communities, manage finances, help with marketing, and perform quality assurance and warranty management
 - » build and repair docks and other facilities
 - » pump gas, cook in the clubhouse kitchen, etc.
- marine research and development facilities, working on marine instrumentation and other products, including autonomous (robotic) and piloted underwater vehicles, cabled observatories, “smart” buoys, etc.

FOR MORE INFORMATION:

- [International Longshore and Warehouse Union](#)
- [Work BC Longshore Worker profile](#)
- [BC Maritime Employers Association](#)



- marine equipment manufacturing plants
- chandleries (stores devoted to marine goods)
- marine law and insurance offices
- ship brokering and chartering offices (ship brokers are intermediaries: they bring together ship owners with those who want to buy the ships or charter them to transport cargo)

The chart below divides **Support It** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



SUPPORT IT POSSIBILITIES

Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Architectural Sheet Metal Worker • Boom Truck Operator • Carpenter • Diesel Engine Mechanic • Electrician, Industrial • Electrician, Marine • Inboard/Outboard Engine Mechanic • Industrial Mechanic (Millwright) • Heavy Duty Equipment Mechanic • Heavy Duty Equipment Technician • Heavy Duty Operator • Marine Mechanical Technician • Marine Service Technician – see <i>Sample Bundle 1</i> for a possible route to this career • Mobile Crane Operator • Painter • Parts and Warehousing Person • Pipefitter • Plumber • Professional Cook 1, 2, and 3 • Refrigeration and Air Conditioning Mechanic • Welder <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Cabinet Maker • Ironworker • Glazier • Metal Fabricators (Fitter) • Truck and Transport Mechanic • Security Systems Technician • Steamfitter/Pipefitter 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate



Route:	Job Possibilities:	Possible Credentials:
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accounting Technician and Bookkeeper • Administrative Assistant • Contractors and Supervisors, Carpentry Trades • Contractor and Supervisor, Equipment Operator Crews • Construction Inspectors • Drafting Technologist or Technician • Diver • Electrical and Electronics Engineering Technologist or Technician • Electronics Technician • Insurance Broker • Junior Manager/Supervisor: <ul style="list-style-type: none"> • Advertising, Marketing and Public Relations • Computer and Information Systems • Food Services • Restaurant • Legal Administrative Assistant • Lifesaving Appliance Technician • Marine Engineer • Marine Pilot • Marine Surveyor • Mechanical Engineering Technologist or Technician • Purchasing Officer • Warranty Manager <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Civil Engineering Technologist or Technician • Construction Estimator • Estimator • Inspector • Junior Manager/Supervisor: <ul style="list-style-type: none"> • Computer and Information Systems • Human Resources • Product • Project • Operations • Quality • Policy Researcher • Warehouse Worker • Safety Attendant 	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Automation and Robotics Technician Diploma • Business Administration Diploma • Certificate in Aluminum Boat Building • Computer Aided Design and Drafting Diploma • Culinary Management Diploma • Business Administration Diploma • Electrical Engineering Technologist Certificate • General Insurance and Risk Management Diploma • Hospitality Management Diploma • Legal Administrative Assistant Certificate • Light Warehouse Training Certificate • Marine Engineering Diploma • Nautical Sciences Diploma of Technical Studies • Management Skills for Supervisors Certificate • Mechatronics and Robotics Diploma of Technology • Project Management Associate Certificate • Project Management Professional (PMP) Certificate • Coating Inspection Certification

Route:	Job Possibilities:	Possible Credentials:
Degree	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accountant • Engineer: <ul style="list-style-type: none"> • Civil • Electrical and Electronics • Marine • Mechanical • Naval Architect • Financial auditor • Lawyer • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Advertising, Marketing and Public Relations • Computer and Information Systems • Financial • Food services • Restaurant • Supply Chain <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Project • Quality • Sales 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Arts in Environmental Studies • Bachelor of Commerce • Bachelor of Engineering • Bachelor of Science • Bachelor of Technology in Manufacturing <p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications • a master's degree and/or • a doctoral degree
Direct-to-Work	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Boat Canvas Fabricator • Food and Beverage Server • Kitchen Assistant • Longshore Worker • Marine Painter/Finisher • Marine Upholsterer • Marine Surveyor • Marketing/Salesperson • Parts Person • Office Support Worker • Receptionist • Security Guard • Ship Broker/Charterer • Yard Labourer <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Cleaner • Clubhouse Staff • Dock Hand • Gas Dock Attendant • Janitor • Marketing/Salesperson • Truck Driver 	<p>On-the-job training is available for many marine sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Certificate in Sales and Marketing • Heavy Equipment Operator Technician Certificate • Hospitality Certificate • Truck Driver Certificate





MARINE SUB-SECTOR PROFILE #4: PROTECT IT

Organizations directly involved in protecting the safety of ships and their crews include:

- [Transport Canada](#)
- [Canadian Coast Guard](#)
- [Royal Canadian Navy](#)
- [Western Canada Marine Response Corporation](#)
- [RCMP BC – West Coast Marine Services](#), and
- [Canadian Lifeboat Institution](#)



Many of the jobs in these organizations are at sea, covered under the **Sail It** sub-sector, while others are on land. At Transport Canada, for example, shore-based safety/protection jobs include developing marine regulations, standards, policies, and legislation, as well as completing inspections and issuing licences. At the Coast Guard, shore-based jobs include Marine Communications Officer and Environmental Response Specialist (the Coast Guard is the lead agency for responding to marine pollution and oil spills in Canadian waters), as well as jobs concerned with operating and maintaining lighthouses and buoys.

In addition, [Fisheries and Oceans Canada](#) and a number of other government and non-government ocean sciences and environmental organizations work in research laboratories and out in the field to protect and restore marine life, lakes, oceans, and coastlines.

The following chart divides **Protect It** job possibilities into high-demand and lower-demand jobs. The list of high-demand occupations is based on industry feedback and the [British Columbia 2025 Labour Market Outlook](#).



PROTECT IT POSSIBILITIES

Route:	Job Possibilities:	Possible Credentials:
Apprenticeship	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Heavy Duty Equipment Technician • Heavy Duty Operator • Mobile Crane Operator 	<ul style="list-style-type: none"> • ITA Certificate of Qualification • Interprovincial Red Seal Certificate
Certificate or Diploma	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accounting Technician and Bookkeeper • Administrative Assistant • Biologist (Marine/Fisheries) • Diver • Electrical and Electronics Engineering Technologist or Technician • Electronics Technician • Junior Manager/Supervisor: <ul style="list-style-type: none"> • Advertising, Marketing, and Public Relations • Computer and Information Systems • Geologist (Marine) • Environmental Engineering Technologist or Technician <p><i>Lower demand:</i></p> <ul style="list-style-type: none"> • Inspector • Junior Manager/Supervisor: <ul style="list-style-type: none"> • Computer and Information Systems • Human Resources • Operations • Policy Researcher 	<p>Certificate and diploma programs (13 weeks and up) available at BC post-secondary institutions include:</p> <ul style="list-style-type: none"> • Business Administration Diploma • Electrical Engineering Technologist Certificate • Environmental Protection Technology Diploma • Management Skills for Supervisors Certificate
Degree	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Accountant • Biologist (Marine/Fisheries) • Engineer: <ul style="list-style-type: none"> • Environmental – see <i>Sample Bundle 3 for a possible route to this career.</i> • Electrical and Electronics • Geological • Geologist (Marine) • Hydrologist • Natural and Applied Science Policy Analyst/Researcher 	<p>All of these occupations require a bachelor's degree, such as:</p> <ul style="list-style-type: none"> • Bachelor of Arts in Environmental Studies • Bachelor of Commerce • Bachelor of Engineering • Bachelor of Science – Environmental Sciences • Bachelor of Technology in Manufacturing <p>Some also require:</p> <ul style="list-style-type: none"> • additional certifications • a master's degree, and/or • a doctoral degree

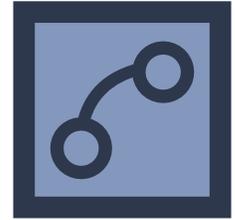


<p>Degree (cont)</p>	<ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Advertising, Marketing, and Public Relations • Computer and Information Systems • Environmental Program Development • Financial <i>Lower demand:</i> <ul style="list-style-type: none"> • Senior Supervisor/Manager: <ul style="list-style-type: none"> • Human Resources • Product • Project • Quality 	
<p>Direct-to-Work</p>	<p><i>High demand:</i></p> <ul style="list-style-type: none"> • Clean-up Crew • Lighthouse Operator • Marine Surveyor • Office Support Worker • Receptionist • Security Guard <p><i>Lower demand</i></p> <ul style="list-style-type: none"> • Marketing/Salesperson • Truck Driver 	<p>On-the-job training is available for many marine sector jobs. There are also some short training and certificate programs (from a few days up to 12 weeks) available at select BC post-secondary institutions. They include:</p> <ul style="list-style-type: none"> • Certificate in Sales and Marketing • Truck Driver Certificate





Photo: Canadian Coast Guard



CANADIAN COAST GUARD COLLEGE OFFICER TRAINING PROGRAM

The Canadian Coast Guard College, located in Sydney, Nova Scotia, offers a **four-year Officer Training Program in navigation and marine engineering** specifically geared to protecting Canada's waterways and the people who travel on them.

The 45-month training period combines in-class theory at the college with practical experience at sea on Coast Guard vessels, allowing Officer Cadets to gain a thorough understanding of ship operations and the latest in marine technology in real-life situations.

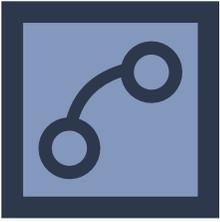
Officer Cadets leave the college with:

- a Bachelor of Technology in Nautical Sciences from Cape Breton University
- a Canadian Coast Guard Diploma
- commercial certification recognized by Transport Canada, and
- a job with the Canadian Coast Guard

Tuition, room and board, and textbooks are free. All students also receive a monthly allowance while at the college and additional funding during training at sea. In return, Officer Cadets must commit to serve with the Government of Canada for four years after graduation.

The college also offers:

- a **three-year Marine Electronic Technologist Development Program** for graduates of an accredited community college or institute of technology, and
- a **23-week Marine Communications and Traffic Services** course.



MARINE SECTOR CAREER ROUTES – SAMPLE BUNDLES

The four sample bundles of high school and post-secondary courses and training that follow illustrate how high schools, post-secondary institutions, industry partners, and employers may work together to develop a particular path for students to follow.

SAMPLE BUNDLE 1: APPRENTICESHIP ROUTE – MARINE SERVICE TECHNICIAN

A Marine Service Technician (MST) does “whole boat repair,” handling structural and/or cosmetic repairs in wood, composite, or metal motor and sail vessels up to 150 feet in length. This includes repainting and refinishing, repairing rigging, etc. An MST also:

- assists in lifting and salvage operations
- performs mechanical repairs on steering, propulsion, cooling, and engine systems
- troubleshoots and assesses electrical vessel components

MSTs are usually employed by marinas, repair yards, boat builders, and specialty marine businesses that provide equipment, repair, and maintenance services.

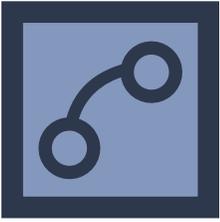
QUADRANT MARINE INSTITUTE in Sidney developed the British Columbia MST apprenticeship training program to expose trainees to all aspects of the repair and maintenance of recreational and small commercial vessels.

The four levels of Quadrant’s MST training program, delivered in the evenings from September to May, usually take four years to complete, while the student is also working in the recreational marine industry. Apprentices are expected to attend all scheduled classes, participate in hands-on workshops, and complete weekly homework assignments. Aside from weekly class time, study and homework will take one or two hours.



APPRENTICESHIP ROUTE – MARINE MECHANICAL TECHNICIAN

Core High School Courses and Electives	Career-Preparation Certificates	Quadrant's Marine Service Technician Apprentice Program	Credential
<p><i>Recommended core courses:</i></p> <ul style="list-style-type: none"> • English 12 • Math 12 • Science 12 <p><i>Recommended electives:</i></p> <ul style="list-style-type: none"> • Engine and Drivetrain 12 • Machining and Welding 12 • Metalwork 11/12 • Woodwork 11/12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B • Youth Explore Skills Trades Sampler • Youth Explore Skills Trades • Youth Train in Trades (TRN) • Youth Work in Trades (WRK) 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • Confined Space Awareness • Marine Basic First Aid • Small Vessel Operator • WHMIS • Driver's Licence 	<p><i>Technical training includes successful completion of:</i></p> <ul style="list-style-type: none"> • 24 in-school core practical competencies in such areas as: <ul style="list-style-type: none"> • installations • electricity • wood • paint • tools • 6 elective advanced practical competencies, such as: <ul style="list-style-type: none"> • perform cold moulding operations • weld marine metals • remove and install engines <p>Students must also complete 4,000 hours</p>	<ul style="list-style-type: none"> • ITA Certificate of Qualification



SAMPLE BUNDLE 2: CERTIFICATE OR DIPLOMA ROUTE – CHIEF MATE

A ship operates through team work between the deck crew and the engine department. While the engine department ensures safe running of the ship's machinery, the deck crew handles all other operations. One of the most important ranks among deck officers is that of Chief Mate (also known as Chief Officer or First Mate).

On larger vessels sailing internationally, the Chief Mate is second in command after the Master of the ship. Sailing in local waters, a Chief Mate may be certified to be the Master of the vessel.

The Chief Mate is responsible for:

- navigation
- cargo loading and unloading
- ship stability (ensuring loads are balanced so the ship does not overturn)
- ship maintenance
- deck crew training, scheduling, and welfare
- safety and security

Camosun College is one of several BC post-secondary institutions to offer Chief Mate training, through its **NAUTICAL TRAINING** program.



CERTIFICATE OR DIPLOMA ROUTE – CHIEF MATE

Core High School Courses and Electives	Career-Preparation Certificates	Camosun College Chief Mate Program	Credential
<p><i>Recommended core courses:</i></p> <ul style="list-style-type: none"> • English 12 • Math 12 • Science 12 <p><i>Recommended electives:</i></p> <ul style="list-style-type: none"> • Applied skills elective 11 or 12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • WHMIS • Marine Basic First Aid • Small Vessel Operator • Class 4 Driver's Licence 	<ul style="list-style-type: none"> • Cargo, Level 3 • Celestial Navigation • Deviascope • Electronic Chart Display and Information Systems • Engineering Knowledge • Marine Advanced First Aid • Meteorology • Navigation Systems and Instruments • Simulated Electronic Navigation • Ship Construction and Stability • Ship Management, Level 3 	<ul style="list-style-type: none"> • Certificate of Competency, Transport Canada

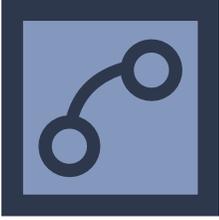


SAMPLE BUNDLE 3: DEGREE ROUTE – ENVIRONMENTAL ENGINEER

Environmental engineering is the application of science and engineering principles to improve air, land, water, and living systems for a healthy environment. Environmental engineers help control and decrease adverse environmental impacts by applying beneficial engineering practices. They also investigate the possibilities for remediation of polluted sites.

The **UNBC/UBC ENVIRONMENTAL ENGINEERING PROGRAM** is a unique, four-and-a-half-year joint degree offered collaboratively between the University of Northern British Columbia and the University of British Columbia.

It starts with a two-year foundation in mathematics, basic and environmental sciences at UNBC. In the third and fourth years, students move to UBC, where the program covers engineering fundamentals, analysis, and design, largely through courses in Civil Engineering and Chemical and Biological Engineering. Students complete their degree with a final term at UNBC where they focus on practical environmental engineering design problems.



DEGREE ROUTE – ENVIRONMENTAL ENGINEER

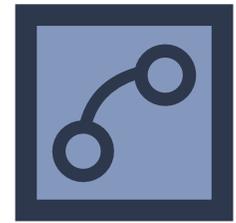
Core High School Courses and Electives	Career-Preparation Certificates	UBC/UNBC Environmental Engineering Program	Credential
<p><i>Required:</i></p> <ul style="list-style-type: none"> • Biology 11 or 12 • Chemistry 11 • English 12 • Principles of Math 12 or Pre-Calculus 12 <p><i>Recommended electives:</i></p> <ul style="list-style-type: none"> • Physics 12 • Two science 12 courses • Applied skills elective 11 or 12 • Relevant locally developed Board/ Authority Authorized (BAA) courses, where available • Work Experience 12A and 12B 	<p><i>Recommended:</i></p> <ul style="list-style-type: none"> • CPR • WHMIS • Marine Basic First Aid • Small Vessel Operator • Class 4 Driver's Licence 	<p><i>Year 1 and 2 courses include:</i></p> <ul style="list-style-type: none"> • Engineering Tools • Fundamentals of Environmental Engineering • Introduction to Aquatic Systems • Introduction to Environmental Science • Weather and Climate <p><i>Year 3 to 4.5 courses include:</i></p> <ul style="list-style-type: none"> • Environmental Engineering • Designing Solutions in Environmental Engineering • Climate Change and Global Warming • Storms 	<ul style="list-style-type: none"> • Bachelor of Applied Science in Environmental Engineering



SAMPLE BUNDLE 4: DIRECT-TO-WORK ROUTE – BRIDGE WATCH/DECKHAND

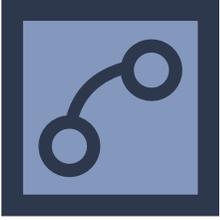
Western Maritime Institute (among other post-secondary institutions, including BCIT) offers a 12-week **BRIDGE WATCH RATING PROGRAM** that provides entry-level training for those who have little or no marine experience but would like to work as deckhands in the marine industry.

Approved by Transport Canada, the program is a prerequisite to sail as a deckhand on vessels over 500 gross tonnage with major tug and barge employers, as well as the Canadian Coast Guard and BC Ferries.



DIRECT-TO-WORK ROUTE – BRIDGE WATCH/DECKHAND

Core High School Courses and Electives	Career-Preparation Certificates	WMI Bridge Watch Rating Training Program	Credential
<p><i>Recommended:</i></p> <ul style="list-style-type: none"> Grade 12 <p><i>Recommended:</i></p> <ul style="list-style-type: none"> Mathematics, English, and science courses 11 or 12 Applied skills elective 11 or 12 Relevant dual credit courses, where available Relevant locally developed Board/ Authority Authorized (BAA) courses, where available Work Experience 12A and 12B 	<p><i>Required:</i></p> <ul style="list-style-type: none"> Candidate Document Number (CDN) from Transport Canada <p><i>Recommended:</i></p> <ul style="list-style-type: none"> Small Vessel Operator Seafarer’s Medical FOODSAFE Marine Basic First Aid 	<ul style="list-style-type: none"> Bridge Watch Rating Course Marine Emergency Duties (Basic Safety) Certificate Marine Emergency Duties (Survival Craft and Rescue Boats) Certificate Marine Basic First Aid Certificate Restricted Operator Certificate – Marine Commercial 	<ul style="list-style-type: none"> Certificate of Competency, Transport Canada



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