

International Centre for Ocean Development
Centre international d'exploitation des océans

**DIRECTORY OF
MARINE TRAINING
IN CANADA — 1988**

**RÉPERTOIRE DE
FORMATION MARITIME
AU CANADA — 1988**



The International Centre for Ocean Development was established as a federal Crown Corporation in February 1985 with a mandate to initiate, encourage and support cooperation between Canada and developing countries in the field of ocean resource development. Under the guidance of a 14-member Board of Directors including four international members, ICOD initiates and supports programmes for the development of indigenous expertise and institutions in developing countries for the improved management and utilization of ocean resources, particularly as a source of food. Programmes are carried out by enlisting individual and institutional expertise in Canada, developing countries and elsewhere and by developing and sponsoring the collection and dissemination of information, training programmes, technical assistance, advisory services and research relating to ocean resource development.

ICOD Offices

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Vancouver, British-Columbia, Canada
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Fondé en février 1985 à titre de société d'État, le Centre international d'exploitation des océans s'est vu confier le mandat de prendre l'initiative de la coopération entre le Canada et les pays en voie de développement dans le domaine de la mise en valeur des ressources océaniques, de l'encourager et d'y apporter son appui. Sous la direction d'un conseil d'administration de 14 membres, dont quatre ne sont pas Canadiens, le CIEO lance et soutient des programmes de développement des compétences et institutions indigènes dans les pays en voie de développement afin de favoriser une meilleure gestion et une meilleure utilisation des ressources océaniques, notamment comme sources de nourriture. Sur le plan pratique, le Centre fait appel, pour l'exécution des programmes, à la compétence des particuliers et des organismes au Canada, dans les pays en voie de développement et ailleurs et il crée ou parraine des programmes de collecte et de diffusion de l'information, de formation, d'assistance technique, de prestation de services consultatifs et de recherche en matière de mise en valeur des ressources océaniques.

Bureaux du CIEO

Pour plus de renseignements ou pour obtenir des exemplaires du présent Répertoire:

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V6C 3E2
Téléphone (604) 641-1206.

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The latter part of our century has witnessed a growing interest in the aquatic environments of the world. The oceans have become a major source of food, both from the harvesting of natural populations, and the farming of marine organisms. Pollution of the world's oceans has become an important consideration in the survival of marine life; in some instances, it has posed local threats to public health. Lakes and streams are also critical as sources of food and are similarly threatened by a variety of pollutants. As never before, knowledge and understanding of aquatic environments is important in virtually all parts of the world.

This Directory will assist the International Centre for Ocean Development in planning the training programmes and managing the scholarship activities that are important elements in fulfilling its mandate to support cooperation between Canada and developing countries in the field of ocean resource development. It will also serve to underscore Canadian enthusiasm for students and visitors from abroad for training and research. The Directory should also be helpful to any who wish to quickly gain a perspective on Canadian activity in these areas of traditional Canadian interest and specialization.

Within five years, the directory will certainly require revision because the educational and research scene is always on the move. If you have any suggestions for how it might be improved in subsequent editions, please advise the editors. Meanwhile, on behalf of the Canadian educators and researchers, I hope you will find this a useful source of information that will assist you in planning your sojourn in Canada.

P. A. Larkin
The University of British Columbia
January 1988

Le XX^e siècle, qui tire à sa fin, éveille chez l'homme un intérêt grandissant pour les milieux aquatiques. Les océans sont aujourd'hui une importante source de nourriture, la culture d'organismes marins s'ajoutant à la pêche. Or, la pollution des mers du monde constitue un grave danger pour la survie des espèces marines, et ce fléau a même menacé la santé publique dans certaines régions. Les lacs et les ruisseaux, d'autres sources précieuses de nourriture, n'échappent pas aux dangers que posent les nombreux polluants. Dans presque tous les coins du monde, il est donc plus que jamais important de connaître et de comprendre les milieux aquatiques.

Le présent répertoire aidera le Centre international d'exploitation des océans (CIEO) à planifier ses programmes de formation et à diriger ses activités relatives aux bourses d'étude, deux moyens grâce auxquels il peut s'acquitter de son mandat qui consiste à favoriser la collaboration entre le Canada et les pays en développement dans le domaine de l'exploitation des ressources océaniques. Il permettra également de se rendre compte de l'enthousiasme qui règne au Canada dans les domaines de la formation et de la recherche en ce qui concerne l'accueil des étudiants et visiteurs étrangers. Enfin, il sera utile à quiconque désire avoir un aperçu des activités canadiennes dans des secteurs qui, traditionnellement, revêtent un intérêt et constituent une spécialisation pour le Canada.

D'ici à cinq ans, le répertoire devra certainement être révisé car le milieu de l'éducation et de la recherche évolue constamment. Si vous désirez suggérer des moyens de l'améliorer, n'hésitez pas à vous adresser aux éditeurs. J'espère, comme tous les enseignants et chercheurs canadiens, que ce répertoire sera pour vous une source utile de renseignements, qui vous aidera à planifier votre séjour au Canada.

P. A. Larkin
University of British Columbia
janvier 1988

Training is one major activity through which the International Centre for Ocean Development initiates, encourages, and supports cooperation between Canada and developing countries in the field of ocean resource management and development. ICOD designs, develops, and delivers courses and provides and manages selected scholarship programmes in its target regions to meet the specific needs of developing countries for trained people in the ocean sector. In implementing its training programme, ICOD utilizes the expertise of the people and institutions both in Canada and in the developing countries themselves.

In establishing its first courses and scholarships, ICOD soon realized that there existed no single source to guide interested individuals and organizations to the ongoing marine-related education and training available in Canada. This *Directory* is a first attempt at filling this gap.

The paragraphs below outline the methodology used to compile this first edition.

Scope of Coverage

Included here are the marine-related programmes, courses, and associated research specializations of 72 Canadian universities, colleges, technical schools, and government departments. Excluded is the marine-related training offered on a regular basis by private industry, although we will include this information in a subsequent edition.

Future Editions

In compiling the *Directory*, we confirmed our initial suspicion that courses and programmes with a marine component are incorporated into the curricula of training institutions in a surprising variety of ways. Within the limits of a budget and to meet our goal of producing a useful directory during 1988, we undertook to cross check and confirm information tracked down by letter, telephone, and inspection of calendars, directories, and other documents. Nonetheless, there are undoubtedly omissions and gaps. We have consequently undertaken to distribute the *Directory* widely within Canada to stimulate institutions within Canada to actively send us input, updates, and revisions for a second edition currently planned for 1990.

La formation est une activité importante permettant au Centre international d'exploitation des océans (CIEO) d'instaurer, de favoriser et d'appuyer la collaboration entre le Canada et les pays en développement dans le domaine de la gestion et de l'exploitation des ressources océaniques. En plus de concevoir et de donner des cours, le CIEO fournit et gère des programmes de bourses dans des régions cibles, afin de répondre au besoin qu'ont les pays en développement d'avoir des cadres qualifiés dans le domaine des affaires maritimes. Pour mettre en oeuvre son programme de formation, le CIEO fait appel aux connaissances et à l'expérience de particuliers et d'organismes autant au Canada que dans les pays en développement.

Lorsque le CIEO a offert ses premiers cours et ses premières bourses d'études, il s'est rendu compte qu'il n'existait pas de document de référence pouvant renseigner les personnes et les organismes intéressés sur l'ensemble des programmes d'études et de formation offerts au Canada dans le domaine des affaires maritimes. La publication du présent répertoire vise donc à combler ce manque.

Les paragraphes qui suivent expliquent la méthode qui a été utilisée pour produire ce répertoire.

Portée

Le répertoire fournit la liste des programmes, des cours et des spécialisations en recherche de 72 universités, collèges, écoles techniques et ministères, dans le domaine des affaires maritimes. Bien qu'on ne traite pas, dans l'édition actuelle, de la formation habituellement offerte dans ce domaine par l'industrie privée, on compte le faire dans une édition subséquente.

Éditions Futures

L'établissement de ce répertoire a confirmé nos soupçons selon lesquels les cours et les programmes relatifs aux affaires maritimes étaient intégrés aux programmes d'études des établissements d'enseignement de manière très variée. Pour respecter les limites de notre budget et atteindre notre objectif qui consistait à produire un répertoire utile en 1988, nous avons entrepris de contre-vérifier et de confirmer les renseignements recueillis par le courrier, par téléphone ou encore en consultant des calendriers, des annuaires et d'autres documents. Nous ne doutons pas

Criteria for Inclusions

- 1) Only marine-related training offered on a regular basis is included.
- 2) Where it was available, information on the marine-research interests and specialties of individual staff members at an institution has been included.
- 3) The actual content of training courses offered at technical schools, by government agencies, and to obtain merchant-marine certifications is included when possible.
- 4) Excluded is information on admission requirements, prerequisites to enroll in particular courses, and other specific degree or diploma requirements. Interested persons are encouraged to contact the relevant institution to obtain this information using the address information incorporated in the Directory.
- 5) Also excluded are limnological and fresh-water related courses except where these have a significant marine component (as for example would an aquaculture course that emphasizes maricultural aspects).

Index

To aid the reader in quickly locating a subject index entry, a 3-letter symbol [*that is not usually an official acronym for the organization*] is used that is set in type along the length of the page and appears in the outside margin of the relevant page.

The Subject Index lists programmes by their actual name in the language (English or French) in which they are offered.

qu'il existe des omissions et des lacunes dans ce répertoire; c'est pourquoi nous avons décidé de le distribuer dans l'ensemble du Canada afin d'encourager les établissements d'enseignement à nous proposer des ajouts, des mises à jour et des révisions pour la deuxième édition, qui devrait paraître en 1990.

Données Incluses et Exclues

- 1) Le répertoire ne présente que les cours et les programmes de formation offerts de façon régulière dans le domaine des affaires maritimes.
- 2) Nous avons inclus des renseignements sur les intérêts et les spécialisations du personnel attaché aux différents établissements, en ce qui concerne la recherche dans le domaine maritime, lorsque nous disposions de ces renseignements.
- 3) Lorsque c'était possible, nous avons indiqué le contenu des cours offerts par les écoles techniques et les organismes gouvernementaux ainsi que le contenu des cours permettant d'obtenir un certificat de travail dans la marine marchande.
- 4) Le répertoire ne fournit pas de renseignements ni sur les conditions d'admission, ni sur les préalables de l'inscription à un cours particulier, ni sur les diplômes requis. Nous invitons les intéressés à communiquer avec l'établissement sur lequel il désire se renseigner; ils trouveront les adresses nécessaires dans le répertoire.
- 5) Le répertoire ne présente pas non plus les cours portant sur la limnologie et l'eau douce, sauf si une partie importante de ces cours est consacrée au milieu marin (comme par exemple, un cours sur l'aquiculture mettant l'accent sur la mariculture).

Index

Afin d'aider le lecteur à trouver rapidement un sujet indiqué dans l'index, un symbole de trois lettres [*qui ne constitue pas le sigle officiel de l'organisme*] apparaît à l'index de même que dans la marge extérieure de la page où ce sujet est traité.

Dans l'index des matières, le nom des programmes est indiqué soit en anglais soit en français, selon la langue dans laquelle ces programmes sont offerts.

Language and Headings

- 1) Courses offered in English appear in English; those offered in French appear in French; and those offered in both languages are listed in both.
- 2) The "Specialized Marine Programs" heading identifies the departments of an institution that offer such programmes and the degrees, certificates, or diplomas that are granted upon successful completion of the programme. Note that for universities, this designation identifies the majors, minors, concentrations, or specializations in marine-related fields offered at a particular institution: for example, a "B.Sc, Marine Biology" versus a "B.Sc, Biology" as reflected on the student's official graduation diploma or certificate.
- 3) The "Departments, Institutes" heading designates departments, faculties, schools, and institutes offering marine-related programmes.
- 4) Separate departmental sections (e.g., Department of Biology) include information on the degrees to which the courses listed form a part and may differ from the degrees associated with the "Specialized Marine Programs" section. Undergraduate courses are listed in alphabetical order with short dashes and an alphabetical listing of the postgraduate courses follows, if any, with long dashes. Note that courses offered at both undergraduate and graduate levels are listed as undergraduate courses.

Langue Utilisée et Rubriques

- 1) Le titre des cours offerts en anglais est indiqué en anglais, celui des cours offerts en français est indiqué en français et celui des cours offerts dans les deux langues est indiqué dans les deux langues.
- 2) Sous la rubrique "Programmes spécialisés dans le domaine maritime", on trouve le nom des départements des établissements d'enseignement qui offrent ces programmes spécialisés ainsi que l'indication des diplômes ou des certificats délivrés aux étudiants qui terminent les programmes. Dans le cas des universités, les matières principales et secondaires, les concentrations ou les spécialisations offertes dans le domaine maritime sont indiquées : par exemple, on verra "baccalauréat ès sciences en biologie marine" par opposition à "baccalauréat ès sciences en biologie", comme l'indiquera le diplôme ou le certificat officiel de l'étudiant.
- 3) Sous la rubrique "Départements, instituts", on trouve la liste des départements, des facultés, des écoles et des instituts offrant des programmes d'études dans le domaine maritime.
- 4) Les sections des différents départements (ex. : Département de biologie) expliquent les rapports entre les cours listés et les diplômes des "Programmes spécialisés dans le domaine maritime". Les cours de premier cycle sont énumérés par ordre alphabétique avec des petits tirets et les cours de troisième cycle, s'il y a lieu, sont également listés par ordre alphabétique, avec de longs tirets. *Veillez Noter* que les cours offerts au premier cycle et au deuxième cycle sont tous deux indiqués dans la première liste.

Additional References

- 1) *Canadian university resources for international development 1985* / edited by Julia Hill-Downham — Ottawa: A.U.C.C., 1985. — 364p. ISBN: 0-88876-093-0. Available from: A.U.C.C., 151 Slater St., Ottawa, Ont., \$15.00.
- 2) *Directory of Canadian universities 1986—87* / edited by Kimberley Allen — Ottawa: A.U.C.C., 1985. — 402 p., ISBN: 0-88876-105-8. Available from: A.U.C.C., 151 Slater St., Ottawa, Ont., \$12.50.
- 3) *1986 Catalogue of training courses available to the Atlantic Fishing Industry / Federal-Provincial Atlantic Fisheries Committee.* — Ottawa: Department of Fisheries & Oceans, 1986. — 169p. — (General Education Series; 3).

Autres Documents de Référence

- 1) *Ressources des universités canadiennes pour le développement international 1985* / rédigé par Julia Hill-Downham — Ottawa : A.U.C.C., 1985. — 364 p. ISBN: 0-88876-093-0. Distribué par : A.U.C.C.C., 151, rue Slater, Ottawa, Ont., 15 \$.
- 2) *Répertoire des universités canadiennes pour le développement international 1985* / rédigé par Kimberley Allen — Ottawa : A.U.C.C., 1985. — 402 p., ISBN: 0-88876-105-8. Distribué par : A.U.C.C.C., 151, rue Slater, Ottawa, Ont., 12,50 \$.
- 3) *1986 Catalogue of training courses available to the Atlantic Fishing Industry / Federal-Provincial Atlantic Fisheries Committee.* — Ottawa: Department of Fisheries & Oceans, 1986. — 169 p. — (General Education Series; 3).

Further Information

We welcome any suggestions you would care to make for improvements to the *Directory of Marine Training in Canada*. Please address all correspondence concerning this publication to:

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Renseignements

Nous vous invitons à nous suggérer des moyens d'améliorer le *Répertoire de formation maritime au Canada*. Le courrier concernant cette publication doit être envoyé à l'adresse suivante :

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Télex 019-21670 ICOD HFX
Téléfax 902-426-4464



MAP AND INDEX BY PROVINCE/ PLAN ET INDEX PAR PROVINCE

Alberta/Alberta

University of Alberta	Edmonton
University of Calgary	Calgary

British Columbia/Colombie-Britannique

Camosun College	Victoria
Kwantlen College	Richmond
Malaspina College	Nanaimo
North Island College	Comox
Northwest Community College	Prince Rupert
Pacific Marine Training Institute	North Vancouver
Royal Roads Military College	Victoria
Simon Fraser University	Burnaby
University of British Columbia	Vancouver
University of Victoria	Victoria

Manitoba/Manitoba

University of Winnipeg	Winnipeg
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New Brunswick/Nouveau-Brunswick

Ecole des Pêches du Nouveau-Brunswick/ School of Fisheries of New Brunswick	Caraquet
Mount Allison University	Sackville
New Brunswick Community College	St. Andrew's
Université de Moncton	Moncton/ Shippagan
University of New Brunswick	Fredericton/ Saint John

Newfoundland/Terre-Neuve

Burin District Vocational School	Burin
Carbonear District Vocational School	Carbonear
Eastern Community College	Burin
Marine Institute	St. John's
Memorial University of Newfoundland	St. John's

Nova Scotia/Nouvelle-Ecosse

Acadia University	Wolfville
Canadian Coast Guard College	Sydney
College of Geographic Sciences	Lawrencetown
Dalhousie University	Halifax
Mount Saint Vincent University	Halifax
Nova Scotia School of Fisheries	Pictou
Nova Scotia Institute of Technology	Halifax
Nova Scotia Nautical Institute	Halifax
St. Francis Xavier University	Antigonish
Saint Mary's University	Halifax
Technical University of Nova Scotia	Halifax
University College of Cape Breton	Sydney

Ontario/Ontario

Atmospheric Environment Service	Downsview
Canadian Hydrographic Service	Ottawa
Canadian Underwater Training Centre	Toronto
Carleton University	Ottawa
Centennial College of Applied Art and Technology	Scarborough
Confederation College of Applied Art and Technology	Thunder Bay
Fanshawe College	London
Georgian College of Applied Arts and Technology	Owen Sound
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Transport Canada Training Institute	Cornwall
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University of Western Ontario	London
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Wilfrid Laurier University	Waterloo

Prince Edward Island/Île du Prince Edouard

Holland College	Summerside
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Quebec/Québec

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Québec, Université du, à Montréal (UQM)	103	University of Ottawa (OTT)	77
Québec, Université du, à Rimouski (UQR)	104	University of Prince Edward Island (UPE)	102
Québec, Université du, à Trois-Rivières (UQT)	106	Université du Québec à Montréal (UQM)	103
QUK (Queen's University)	81	Université du Québec à Rimouski (UQR)	104
Queen's University (QUK)	81	Université du Québec à Trois-Rivière (UQT)	106
Rimouski, Université du Québec à (UQR)	104	University of Saskatchewan (USA)	107
RRM (Royal Roads Military College)	82	University of Toronto (Erindale) (UTE)	108
Royal Roads Military College (RRM)	82	University of Toronto (St. George) (UTG)	109
Saint Mary's University (SMU)	86	University of Toronto (Scarborough) (UTS)	111
Saskatchewan, University of (USA)	107	University of Victoria (VIC)	114
Scarborough, University of Toronto (UTS)	111	University of Waterloo (WAT)	115
School of Fisheries of New Brunswick (EPN)	27	University of Western Ontario (UWO)	113
SEN (Seneca College of Applied Art and Technology)	83	University of Windsor (UWD)	112
Seneca College of Applied Art and Technology (SEN)	83	University of Winnipeg (WIN)	116
SFU (Simon Fraser University)	84	UPE (University of Prince Edward Island)	102
Simon Fraser University (SFU)	84	UQM (Université du Québec à Montréal)	103
Sir Sanford Fleming College (SSF)	88	UQR (Université du Québec à Rimouski)	104
SMU (Saint Mary's University)	86	UQT (Université du Québec à Trois-Rivières)	106
SSF (Sir Sanford Fleming College)	88	USA (University of Saskatchewan)	107
St. Francis Xavier University (FXU)	34	UTE (University of Toronto (Erindale))	108
St. George, University of Toronto (UTG)	109	UTG (University of Toronto (St. George))	109
Technical University of Nova Scotia (TUN)	90	UTS (University of Toronto (Scarborough))	111
Toronto, University of, Erindale (UTE)	108	UWD (University of Windsor)	112
Toronto, University of, St. George (UTG)	109	UWO (University of Western Ontario)	113
Toronto, University of, Scarborough (UTS)	111	VIC (University of Victoria)	114
Transport Canada Training Institute (DOT)	24	Victoria, University of (VIC)	114
Trois-Rivières, Université du Québec à (UQT)	106	WAT (University of Waterloo)	115
TRU (Trent University)	89	Waterloo, University of (WAT)	115
Trent University (TRU)	89	Western Ontario, University of (UWO)	113
TUN (Technical University of Nova Scotia)	90	Wilfrid Laurier University (WLU)	117
UBC (University of British Columbia)	91	Windsor, University of (UWD)	112
UCC (University College of Cape Breton)	95	WIN (University of Winnipeg)	116
UDM (Université de Montréal)	96	Winnipeg, University of (WIN)	116
		WLU (Wilfrid Laurier University)	117

SUBJECT INDEX/ INDEX PAR SUJET

Subject/Sujet	Level/Niveau	Institution/Organisme
Fisherman Training/Formation des Pêcheurs		
Able Fisherman	Certificate	EPN
Aquaculture-huîtres et moules	Certificat	EPN
Aquaculture-Oysters and mussels	Certificate	EPN
Chef Mécanicien de Bateau de Pêche	Certificat	EPN
Chief Engineer of a Motor Driven Fishing Vessel	Certificate	EPN MAR
Engins de Pêche	Certificat	EPN
Field Courses for Fishermen	Courses	MAR
Fishing Gear	Certificate	EPN
Fishing Techniques	Courses	MAR
Fishing Technology	Diploma	MAR
Fishing Vessel Chief Engineer	Certificate	NSD
Gas and Diesel Engine and Maintenance	Certificate	EPN
Hydraulics	Certificate	EPN
Hydraulique	Certificat	EPN
Inshore Fishing Operations (Bottom Trawls)	Certificate	NSD
Inshore Fishing Operations (Gill Nets and Fish Traps)	Certificate	NSD
Inshore Fishing Operations (Introduction)	Certificate	NSD
Inshore Fishing Operations (Long Lines and Gear)	Certificate	NSD
Inshore Fishing Operations (Otter Trawls)	Certificate	NSD
Inshore Fishing Operations (Purse Seines)	Certificate	NSD
Inshore Fishing Operations (Scottish and Danish Seines)	Certificate	NSD
	Courses	MAR
Mécanicien de Quart de Bateau de Pêche	Certificat	EPN
Moteurs à essence	Certificat	EPN
Moteurs (diesel)	Certificat	EPN
Nautical Science Technology: Fishing Technology Option	Diploma	MAR
Pêcheur Professionnel	Certificat	EPN
Pre-Sea Training	Certificate	NSD
	Courses	MAR
Soudure	Certificat	EPN
Trawlerman Offshore Fleet	Certificate	NSD
	Courses	MAR
Trawlers	Courses	MAR
Watchkeeping Engineer of a Motor Driven Fishing Vessel	Certificate	EPN MAR
Welding for Fishermen	Certificate	EPN MAR
Marine Business/Administration Maritime		
Administration for Coast Guard Ships Officers	Certificate	DOT
Fishing Business Practice and Record Keeping	Certificate	MAR
	Courses	NSD
Fishing Income Tax Update	Certificate	NSD
	Courses	MAR
International Business	MBA	DAL
Transportation	MBA	DAL
Marine Chemistry/Chimie Marine		
Marine Chemistry	Courses	QUK SMU

Subject/Sujet	Level/Niveau	Institution/Organisme
Marine Communications/Communications Maritimes		
Communications Control Systems (Sperry)	Certificate	DOT
Continuous Marine Broadcast (CMB)	Certificate	DOT
Marine FM (ME-60 and ON-56)	Certificate	DOT
Marine Radio Operations	Certificate	DOT
Marine Single Sideband	Certificate	DOT
Nautel 1 kw Communications Transmitter	Certificate	DOT
Orientation for Coast Guard Radio Operators	Certificate	DOT
Radio Communications	Certificate	MAR
Radio Operations Short Course	Certificate	DOT
Marine Economics, Management, and Planning/Economie, Gestion, et Planification Maritime		
Affaires maritimes	Diplôme	UQR
Environmental Policy and Administration	MES,PhD	DAL
Exploitation et gestion des ressources marines	DEC	CGI
Gestion des pêches	BGP	UMO
Gestion des ressources maritimes	MSc	UQR
Fisheries (Economic) Management	MA,PhD	SFU
Fisheries Economics	Courses	MUN
Fisheries (Resource) Management	MRM	SFU
Marine Affairs	Diploma	DAL
Park Management	Courses	WAT
Resource Economics	Courses	ACA CON MCG QUK SFX SMU UBC UNB UTG
Renewable Resource Management	MSc,PhD	UBC
Resource Management and Ecology	MES,PhD	DAL
Resource Management Officer Technology	Diploma	MAL
Salmonid Enhancement Training Programme	Courses	MAL
Transportation Economics	Courses	ACA CAL UBC
Transportation Planning	Courses	UBC UNB
Transportation Management	Certificate	MCG
Marine Engineering/Génie Maritime		
Civil Engineering Technology: Marine Option	Diploma	SEN
Coastal Engineering	Courses	ALB CON MCM QUK
Coastal and Ocean Engineering	MASc,MEng,PhD	UBC
Electrical Technology	Diploma	MAR
Engineering Cadet	Certificate	NSN
Geological Engineering	MSc,MEng,PhD	UBC
Industrial Instrumentation	Certificate, Apprenticeship	MAR
Marine Electrical Practice	Pre-Apprenticeship	MAR
Marine Electrical Technician	Certificate	MAR
Marine Electronics Technology	Diploma, Certificate	MAR
Ocean Engineering	BEng,MEng,PhD	MUN
Ocean Engineering and Naval Architecture	MEng,MASc,PhD	TUN
Offshore Drilling and Production	Courses	TUN
Petroleum Engineering	Courses	TUN
Ports and Harbours	Courses	UNB
Resources Engineering Technology: Marine Option	Diploma	SEN
Transportation	Diploma,MSE,PhD	UNB
	Courses	CAL
Underwater Acoustics Systems	Courses	VIC
Watchkeeping Engineer	Certificate	HOL

Subject/Sujet	Level/Niveau	Institution/Organisme
Marine Fisheries/Pêches Maritimes		
Aquaculture and Fisheries Biology	BSc(Hons)	UNB
Aquaculture Technician	Certificate	NBC
Études halieutiques	Certificat	UMO
Fish Biology and Aquaculture	BSc,MSc,PhD	UBC
Fisheries Biology	BSc	GUE
	Courses	WAT
Fisheries Populations	Courses	SFU
Fisheries Technology	Certificate	HOL
Population des poissons	Cours	UDM
Marine Geography/Géographie Marine		
Arctic Geography	Courses	QUK TRU
Climate	Courses	UTG
Coastal and Marine Studies	BA(Hons)	SMU
	Courses	UWO VIC
Coastal Geomorphology	Courses	MCM OTT UTS
Fisheries Geography	Courses	MUN
Géographie marine	Cours	UMO UQR
Géomorphologie littorale	Cours	UDM UQR
Marine Geography	Courses	ALB CAL MUN WIN
Resource Management	Courses	CAR OTT UTS VIC CON SFU
Transportation	Courses	CAR UTE
Marine Geology/Géologie Marine		
Geological Engineering	MSc,MEng,PhD	UBC
Marine Geological Resources	BSc	DAL
Marine Geology	MSc,PhD	DAL
	Courses	CAR MCG MUN OTT SFX UNB USA UTG
Marine Law/Droit Maritime		
Coastal and Marine Law	Courses	VIC
International Law	Courses	CAR DAL MCG MUN QUK UNB UTG
Droit de la mer	Cours	CAR
Droit maritime	Cours	OTT UMO
Law of the Sea	Courses	DAL MCG UBC
Marine and Environmental Law	LLB,LLM,JSD	DAL
	Courses	QUK UBC UNB UTG
Resources Law	Research	CAL
	Courses	UBC
Shipping and Admiralty Law	Courses	DAL UTG UWD
Marine Mechanical Engineering/Génie Mécanique Maritime		
Assistance Mécanique	Certificat	IMR
Diesel/Gasoline Engine Mechanics	Certificat	MAL
Initiation aux moteurs diesels	Certificat	EPN
Maintien de moteur à essence	Certificat	EPN
Marine and Small Powered Equipment Mechanic	Certificate	CCA FAN HUM
Marine Diesel Mechanic	Certificate	BDV EEC MAR
Marine Engine Mechanics	Certificate	MAL
Marine Engineer	Diploma	PMT
Marine Engineering Technology	Certificate	GCA
	Diploma	MAR
Marine Engineering Trade Upgrading	Courses	CAM
Marine Fitter	Apprenticeship	NSI

Subject/Sujet	Level/Niveau	Institution/Organisme
<i>Marine Mechanical Engineering/Génie Mécanique Maritime continued</i>		
Marine Gas and Diesel Engine Maintenance	Certificate	NSD
Marine Mechanics	Certificate	NBC
Marine Mechanic	Apprentice	SSF
Marine Refrigeration and Air Conditioning	Certificate	DOT
Mécanique de marine	Diploma	GCA IMR DEC
Officier Mécanique, 4e Classe (Moteur)	Certificat	EPN
Officier Mécanique, 3e Classe (Moteur)	Certificat	EPN
Power Engineer (Refrigeration)	Certificate	HOL
Power Engineering Technology	Diploma	MAR
Refrigeration	Certificate	NSD
Refrigeration Plant Operation	Certificate	MAR
Refrigeration and Air Conditioning Mechanics	Apprenticeship	MAR
Marine Pollution/Pollution Marine		
Ecotoxicology	Diploma	CON
Oil and Water Treatment	Certificate	DOT
Oilspill Countermeasures Training	Courses	MAR
Marine-Related Biology/Biologie Marine		
Biologie marine	Cours	UMO UQR UQT
Biopsychology	MSc,PhD	MUN
Ecologie marine	BSc(Hons),MSc,PhD	LAV
	Cours	UDM
Estuarine Biology	Courses	ACA
Fish Biology	Courses	CAR OTT
Marine Biology	BSc	GUE
	BSc(Hons)	DAL MAL MCG MUN UBC VIC
	MSc,PhD	DAL MCG MUN UBC VIC
	Courses	MTA SFX TRU UPE UQM UTE UTG UTS UWM WAT WLU
Marine Ecology	Courses	CAL QUK SFX UBC UCC USA UWO
Marine Parasitology	MSc,PhD	MCG
Marine-Related Food Science/Sciences des Produits Alimentaires Marins		
Cuisine de navire	Certificat	IMR
Fish Plant Worker	Diploma	CDV
	Courses	MAR
Food Science	MSc,PhD	TUN
	Courses	MSV
Food Technology (Marine Products)	Diploma	MAR
	Courses	MUN
Handling and Processing	Courses	MAR
Heat Processing and Container Closure Evaluation	Certificate	MAR
Marine Cooking and Stewarding	Certificate	MAR
Quality Control	Courses	MAR
Refrigeration Plant Operation	Certificate	MAR
	Courses	MAR
Seafood Processing	Certificate	MAR
	Courses	MAR
Transformation des produits de mer	DEC	CGI

Subject/Sujet	Level/Niveau	Institution/Organisme
Marine-Related Hydrography/Hydrographie Marine		
Cartography I	Certificate	CHS
Cartography II	Certificate	CHS
Hydrography I	Certificate	CHS
Hydrography II	Certificate	CHS
Hydrographic Surveying	Certificate, BScE	UNB
	Courses	ALB CAL UTE
Hydrographic Survey Technologist	Diploma	HUM
SEN/ARPA for Nautical Surveyors	Certificate	DOT UNB
Marine Science/Sciences Marine		
Marine Science	BSc(Hons)	ALB CAL SFU VIC
	MSc, PhD	ALB SFU VIC
	Courses	SMU
Maritime History/Histoire Maritime		
Maritime History	BA, MA, MPhil, PhD	MUN
Medecine/Médecine		
Hyperbaric Physiology	Courses	SFU
Offshore and Remote Medicine	Research	MUN
Refresher Course for Rig Medics	Certificate	MUN
Merchant Marine/Marine Marchande		
Able Seaman	Certificate	MAR
B.C. Coast Pilot Exam Preparation	Certificate	PMT
Brevet de Capitaine au long cours (MM)	Certificat	IMR
Brevet de Lieutenant de quart (WKM)	Certificat	IMR
Bridge Watchman	Certificate	MAR
Capitaine d'eaux secondaires	Certificat	EPN
Capitaine de petite embarcation ou de petite embarcation à passagers	Certificat	EPN
Capitaine d'un transbordeur à vapeur	Certificat	EPN
Command Endorsement	Certificate	CAM EPN NSD PMT
Command Endorsements (all levels)	Certificate	GCA NCC NSN
Deckhand Offshore Fleet	Certificate	NSD
Deckhand Training	Certificate	PMT
Engine Room Watchkeeper	Certificate	NSD
Lieutenant de Quart	Certificat	EPN
Lifeboat Coxswain	Certificate	DOT
Lifeboatman Efficiency	Certificate	NSD
Marine and Power Engineering 4th Class	Certificate	HOL
Marine and Power Engineering 3rd Class	Certificate	HOL
Marine and Power Engineering 2nd Class	Certificate	HOL
Marine and Power Engineering 1st Class	Certificate	HOL
Marine Engineer 1st Class	Certificate	CAM MAR PMT
Marine Engineer 2nd Class	Certificate	CAM MAR PMT
Marine Engineer 3rd Class	Certificate	CAM EPN MAR PMT
Marine Engineer 4th Class	Certificate	CAM EPN MAR PMT
Marine Engineering Officer Cadet	Certificate	CCG
Marine Industrial Rigging	Certificate	NSN
Marine Traffic Regulator Training	Certificate	DOT
Matelotage	Certificat	IMR
Mention de commandement (350 tonnes)	Certificat	EPN
Merchant Marine Program	Diploma	MAR
New Entry Seaman	Certificat	NSN
Pre-Sea Deckhand	Courses	MAR
Ship Storekeeper/Clerk	Certificate	DOT
Meteorology/Météorologie		
Meteorology	Courses	DAL MCG

Subject/Sujet	Level/Niveau	Institution/Organisme
Naval Architecture and Systems/Architecture et Systèmes Navals		
Boat Building	Certificate	NBC
Boat Repair	Courses	MAR
Marine Steelwork	Certificate	MAR
Marine Systems Design	Diploma	MAR
Naval Architecture	Diploma	MAR
	BEng	MUN
Ocean Engineering and Naval Architecture	MEng, MAsc, PhD	TUN
Ship Dynamics	BSc	MUN
Small Craft and Marine Technology	Certificate	HUM
Small Craft Design and Construction	Certificate	MAR
Techniques d'architecture navale	DEC	IMR
Navigation/Navigation		
Aide de pointage radar-automatique	Certificat	IMR
Brevet de navigateur océanique I (ON I)	Certificat	IMR
Brevet de navigateur océanique II (ON II)	Certificat	IMR
Capitaine de Pêche, Classe I	Certificat	EPN
Capitaine de Pêche, Classe II	Certificat	EPN
Capitaine de Pêche, Classe III	Certificat	EPN
Capitaine de Pêche, Classe IV	Certificat	EPN
Celestial and Ocean Navigation	Courses	MAR
Coastal Navigation and Pilotage	Courses	MAR
Coastal Navigator I	Certificate	PMT
Coastal Navigator II	Certificate	CAM PMT
First Mate Ferry Steamship	Certificate	MAR NSN
First Mate Home Trade (ON II)	Certificate	MAR
First Mate Inland Waters (CN II)	Certificate	MAR
Fishing Master 1st Class	Certificate	EPN GCA HOL MAR
Fishing Master 2nd Class	Certificate	EPN GCA HOL MAR NCC NSD NSN PMT
Fishing Master 3rd Class	Certificate	EPN GCA HOL MAR NCC NSD NSN PMT
Fishing Master 4th Class	Certificate	EPN GCA HOL MAR NCC NSN
Gyrocompass	Certificate	DOT
Initiation à la navigation	Certificat	EPN
Marine Navigation Technology	Certificate	GCA
Marine Navigator	Certificate	CCA
Master Ferry Long Run	Certificate	CAM
Master Ferry Steamship	Certificate	MAR NSN
Master Ferry Steamship (short run)	Certificate	EPN
Master Home Trade (ON I)	Certificate	MAR
Master Inland Waters (CN I)	Certificate	MAR
Master Mariner	Certificate	CAM GCA HOL MAR PMT
Master Minor Waters	Certificate	EPN GCA HOL NCC NSN PMT
Master Minor Waters Steamship	Certificate	MAR
Master Small Craft (all levels)	Certificate	GCA NSN
Master Small Craft and Master of Small Passenger Ship	Certificate	EPN MAR
Master under 350 Tons and Tugmaster Home Trade	Certificate	MAR
Master 40 ton	Certificate	GCA NCC NSN
Mate and Master (Limited)	Certificate	MAR
Mécanique de marine 4e classe moteur, vapeur et combiné	Certificat	IMR
Mécanique de marine 3e classe moteur, vapeur et combiné	Certificat	IMR
Mécanique de marine 2e classe moteur, vapeur et combiné	Certificat	IMR
Mécanique de marine 1e classe moteur, vapeur et combiné	Certificat	IMR
Navigation	DEC	IMR
Navigation Cadet	Certificate	NSN
Navigation électronique	Certificat	EPN

Subject/Sujet	Level/Niveau	Institution/Organisme
<i>Navigation/Navigation continued</i>		
Navigation électronique simulée I	Certificat	IMR
Navigation électronique simulée II	Certificat	IMR
Navigation for Fishermen	Certificate	EPN
	Courses	MAR
Navigation Officer Cadet	Certificate	CCG
Navigation Upgrading	Certificat	NSN
Ocean Navigator I	Certificate	PMT
Ocean Navigator II	Certificate	PMT
Offshore Navigation II	Certificate	CAM
Shipboard Radar	Certificate	DOT
Simulated Electronic Navigation I	Certificate	DOT PMT MAR
Simulated Electronic Navigation II	Certificate	MAR PMT
Watchkeeping Mate	Certificate	CAM EPN GCA HOL MAR NCC NSN PMT
Watchkeeping Mate Endorsement	Certificate	GCA PMT
Oceanography/Océanographie		
Coastal Oceanography	Courses	ACA
Geological Oceanography	Courses	CON UDM
Océanographie	MSc, PhD	UQR
	Cours	UMO
Oceanography	Diploma	RRM
	BSc(Hons)	UBC
	MSc, PhD	DAL MCG UBC
	Courses	UQM UWD VIC
Physical Oceanography	MSc, PhD	MUN
	Courses	MCM
Remote Sensing/Téledétection		
Oceanography and Acoustics	BSc, MSc	RRM
Remote Sensing	MSc, PhD	UBC
	Diploma	CGS
Safety at Sea/Sécurité Navifique		
Distress Procedures Refresher	Certificate	DOT
Fonctions d'Urgence en Mer I	Certificat	EPN IMR
Fonctions d'Urgence en Mer II	Certificat	EPN IMR
Fonctions d'Urgence en Mer III	Certificat	IMR
Ice Interpretation	Certificate	DOT
Ice Observer	Certificate	AES
Ice Observer Extension	Certificate	AES
Marine Emergency Duties I	Certificate	GCA HOL MAR NSD NSN PMT
Marine Emergency Duties II	Certificate	HOL MAR NSD NSN PMT
Marine Emergency Duties III	Certificate	HOL MAR NSN PMT
Marine Firefighting	Courses	MAR
Petroleum Tanker Safety	Certificate	NSN
Search and Rescue	Certificate	DOT
Tanker Familiarization	Certificate	NSN
Transport et Manutention de Produits Pétroliers	Certificat	IMR
Submersibles and Diving/Submersibles et Plongé Sous-Marine		
Category I Diver	Certificate	CUT
Category I Diver: Contaminated Water Diving	Certificate	CUT
Category I Diver: Diving Module	Certificate	CUT
Commercial and Industrial Diving	Certificate	SEN
Hyperbaric Chamber Operator	Certificate	SEN
North Sea Upgrading	Certificate	CUT
Underwater Skills	Certificate	SEN

**MAIN ENTRIES/
ENTRÉES PRINCIPALES**

Specialized Marine Programs

None

Departments, Institutes

Acadia Centre for Estuarine Research
Biology
Economics
Geology
Interdisciplinary Studies

Acadia Centre for Estuarine Research

Dr. G.R. Daborn, *Director*

The Centre carries out multi-disciplinary research on the estuarine regions of the Bay of Fundy. Areas of research interest include:

- Aquaculture of shellfish
- Coastal and estuarine productivity
- Biophysical interaction
- Ecosystem simulation modelling
- Impact of human construction in coastal zones
- Fish migrations

Department of Biology

Degrees B.Sc(Hons)/M.Sc

Courses

- Aquatic ecology
- Estuarine biology
- Invertebrate zoology
- Phycology
- Estuarine biology (tutorial in)
- Fishery biology
- Ichthyology

Research Areas

Bell, C. • Aquatic microbiology.
Bleakney, J.S. • Marine biology.
Brylinsky, M. • Marine biology, limnology.
Daborn, G.R. • Limnology, estuarine biology.
Dadswell, M.J. • Fisheries biology, marine biology.
Grundl, D.W. • Mycology, phycology.

Department of Economics

Degrees B.A.(Hons)/M.A.

Courses

- Economics of fisheries
- Economics of transportation
- Resource economics (topics in)
- Transportation

Research Areas

Davies, J. • Ocean transportation.
Ffrench, R.A. • Fisheries, ocean transportation.
Tugwell, S.M. • Fisheries, resource economics, environmental issues.
Winter, J.R. • Fisheries and water resources.

Department of Geology

Degrees B.Sc(Hons)

Courses

- Coastal oceanography
- Oceanography (introduction)
- Sedimentology
- Facies models and basin analysis

Research Areas

Cameron, B.W. • Coastal marine geology, coastal sedimentation and microfauna.
Wan Wagoner, M.A. • Marine volcanology, development of oceanic lithosphere.

Interdisciplinary Studies

Dean of Pure and Applied Science

Degrees B.Sc(Hons)

Courses

- Tides of earth

Research Areas

Not available

**ATMOSPHERIC
ENVIRONMENT SERVICE**

Atmospheric Environment Service
Environment Canada,
4905 Dufferin Street
Downsview, Ontario, M3H 5T4
Telephone (416) 667-4913/4862/4514

Specialized Marine Programs

Ice Observer Extension Course — Certificate

Ice Observer Course — Certificate

Ice Observer Extension Course — Certificate

Note: This course is designed to prepare meteorological technicians for the *Ice Observer Course* and is a self-study course over 6 months.

Content

- Arctic history and economics
- Arctic survival
- Geography
- Ice terminology and symbology
- Radar theory
- Radiotelephone

Ice Observer Course — Certificate

Duration 32 days

Content

- Aviation and marine weather
- Aviation safety
- Chart display and briefings
- Coded ice report
- Familiarization flight
- Geography
- Ice centre familiarization
- Ice charts and ice messages
- Ice climatology
- Ice physics
- Ice recognition
- Ice terminology and symbology
- Navigation
- Radar and remote sensing
- Radiotelephone
- Shipboard ice observing and seamanship
- Shipboard weather and shipboard coded ice report
- SLAR interpretation

Office of the Registrar
 University of Alberta
 Administration Building, Room 120,
 Edmonton, Alberta, T6G 2E2
 Telephone (403) 432-3111
 Telex 0372929

UNIVERSITY OF ALBERTA

Specialized Marine Programs

Marine Science (Bamfield Marine Station, Zoology) —
 B.Sc/M.Sc/Ph.D

Departments, Institutes

Bamfield Marine Station
 Boreal Institute for Northern Studies
 Civil Engineering
 Geography
 Mechanical Engineering
 Zoology

Bamfield Marine Station

(See under Bamfield Marine Station in Annex)

Boreal Institute for Northern Studies

Dr. Ross Wein, *Director* (403) 432-4512

The primary objectives of the Boreal Institute are the gathering and dissemination of information about the North in an effort to increase understanding and awareness of this part of Canada. The Institute promotes scholarly research on the North, fosters communication among northern-oriented researchers at the University of Alberta and elsewhere, disseminates knowledge about the North and encourages the involvement of northerners in its activities. Marine-related research interests include the reproductive ecology of Atlantic walrus in the Central Canadian High Arctic; fish diseases in the North; and polar bear studies.

Department of Civil Engineering

Undergraduate Advisor (403) 432-2066

Graduate Advisor (403) 432-2059

Degrees B.Sc/M.Sc/M.Eng/Ph.D

Courses

- Environmental fluid mechanics
- Hydrographic surveying
- Advanced environmental fluid mechanics
- Coastal engineering in cold regions

Research Areas

- Cheng, J.J. • Steel offshore structures.
 Hrudey, T.M. • Ice induced vibrations in offshore structures.
 Kennedy, D.J.L. • Steel offshore structures.
 MacGregor, J.G. • Concrete offshore structures.
 Morgenstern, N.R. • Ice rubble against offshore structures, foundation problems of offshore structures.
 Rajarathan, N. • Environmental fluid mechanics.
 Sego, D.C.C. • Ice rubble against offshore structures, foundation problems of offshore structures in cold regions.

Department of Geography

Chairman (403) 432-3274

Degrees B.A.(Hons)/B.Sc(Hons)/M.Sc/Ph.D

Courses

- Boreal ecology and northern development
- Circumpolar quaternary environments
- Northern lands
- Northern studies

Research Areas

- England, J.H. • Interaction between marine and terrestrial environments at high latitudes; marine ice dynamics.
 Lozowski, E.P. • Marine ice accretion.
 Zakzewski, P. • Marine ice accretion.

Department of Mechanical Engineering

Courses

None

Research Areas

- Gates, E.M. • Marine ice accretion.

Department of Zoology

Marine Science Advisor (403) 432-2373

Note: Other marine science courses are offered at Bamfield Marine Station.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Ichthyology
- Marine biology

Research Areas

- Chia, Fu-Shiang • Embryology of marine invertebrates.
 Nelson, J.S. • Systematics and taxonomy of various groups of fishes, marine families: psychrolutidai, percophidae, and creediidae.
 Palmer, A.R. • Ecology and evolution of marine gastropods.
 Peter, R.E. • Neuroendocrine regulation of pituitary function and the endocrine regulation of growth and reproduction in teleost fish.
 Stacey, N.E. • Endocrinology and physiology of reproduction and reproduction behaviour in fish.
 Wilson, M.V.H. • Vertebrate paleontology and comparative anatomy of fishes.

**BURIN DISTRICT
VOCATIONAL SCHOOL**

Burin District Vocational School
P.O. Box 369,
Burin, Newfoundland, A0E 1E0
Telephone (709) 891-1253

Specialized Marine Programs

Marine Diesel Mechanics — Certificate

Marine Diesel Mechanics — Certificate

Duration 9 months

Content

- Basic mechanics
- Blueprint interpretation
- Diesel engine and power train maintenance
- Exhaust, fuel and electrical systems maintenance
- Lubrication, hydraulic and pneumatic systems maintenance
- Tools, materials, equipment selection and maintenance

Registrar
University of Calgary
2500 University Dr., N.W.,
Calgary, Alberta, T2N 1N4
Telephone (403) 220-5110
Telex 038-21545

UNIVERSITY OF CALGARY

Specialized Marine Programs

Marine Science (Bamfield Marine Station, Biological Sciences) — B.Sc(Hons)

Department, Institutes

Arctic Institute of North America
Bamfield Marine Station
Biological Sciences
Canadian Institute of Resources Law
Civil Engineering
Economics
Environmental Design
Geography
Geology

Arctic Institute of North America (AINA)

M. Robinson, *Executive Director* (403) 220-7515

The purposes of the AINA are to assist and cooperate in the orderly development of the North through the sponsoring of research and the acquisition and dissemination of information. AINA's activities embrace all scholarly disciplines.

In the marine sector, AINA's research and education interests include:

- Marine biology
- Marine structures
- Marine transportation systems
- Polar oceanography
- Remote sensing of ocean surface
- Research stations:
- Underwater technology

Information on: oil spill impact on water; ice scour; and icebergs is available from AINA's on-line database.

Bamfield Marine Station

(See under Bamfield Marine Station in Annex)

Department of Biological Sciences

Dr. R.W. Davies, *Chairman* (403) 220-5260

Note: Marine science courses are offered at Bamfield Marine Station.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Aquatic ecosystems
- Invertebrate zoology
- Vertebrate zoology
- Ecology of fishes
- Environmental physiology
- Limnology & oceanography

Research Areas

Anderson, P.K. • Marine mammals; ecology; conservation.

Arai, M.N. • Fish predation by Hydromedusae; taxonomy; ecology.

Cavey, M.J. • Marine biology; invertebrate zoology; embryology; crustaceans; molluscs.

Culp, J.M. • Fisheries management; fish foraging behaviour; benthos.

McMahon, B.R. • Marine animal physiology; environmental physiology; coastal processes; crustaceans.

Myres, M.T. • Marine ornithology.

Wilkins, J.L. • Crustaceans; marine environments.

Canadian Institute of Resources Law

C.D. Hunt, *Director* (403) 220-3200

The Institute engages in research education and publication activities relating to Resources Law. Marine-related research interests include: the environmental regulation of Arctic petroleum projects; international legal context of petroleum activities in the Beaufort Sea; and water resources law. Non-credit courses are offered in Canadian Offshore Law and Resources and The Constitution.

Department of Civil Engineering

Dr. M.A. Sargious, *Chairman* (403) 220-5820

Degrees B.Sc/M.Sc/M.Eng/Ph.D

Courses

- Transportation planning
- Engineering and deformation surveys
- Hydrographic surveying & marine geodesy

Research Areas

Day, R.L. • Coastal and ocean engineering; creep testing.

Ghali, A. • Offshore structures; ice forces.

Johnston, C.D. • Transportation surveys; harbours; materials useage.

Nakiboglu, S.M. • Tectonophysics; physical oceanography.

Rave, R.D. • Turbulence modelling; subsea oilwell blowout containment; oceanic flow under ice keels.

Vinogradov, O.G. • Ocean engineering; ice mechanics.

Department of EconomicsDr. S.G. Peitchinis, *Chairman***Degrees** B.A.(Hons)**Courses**

- Economic analysis of transportation

Research Areas

None

Department of Environmental DesignDr. G.A. Ross, *Director* (403) 220-6605**Degrees** M.E.Des**Courses**

- Ecology of the Canadian west coast

Research Areas

None

Department of GeographyDr. L.A. Rosenvall, *Chairman* (403) 220-5585**Degrees** B.A(Hons)/B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Climatic change and variability
- Geography of international trade
- Man & environment
- Physical oceanography
- Weather and climate
- Applied remote sensing
- Deltaic sedimentary systems
- Geography of transportation and trade

Research Areas

Giovinetto, M.B. • Climatology; coastal and marine geography; polar geography.

Harris, S.A. • Climatology; environmental geography; geomorphology.

Department of GeologyDr. A.E. Oldershaw, *Chairman* (403) 220-5850**Degrees** B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Introductory geology
- Clastic sedimentology

Research Areas

Hopkins, J.C. • Sedimentology; stratigraphy.

Hutcheon, I.E. • Sedimentology; offshore geochemistry.

Lawton, D. • Applied geophysics; sedimentology.

McGugan, A. • Sedimentology; coastal processes.

Lansdowne College
3100 Foul Bay Road,
Victoria, British Columbia, V8P 4X8
Telephone (604) 592-1281

**CAMOSUN
COLLEGE**

CAM

Specialized Marine Programs

Command Endorsement — Certificate
Coastal Navigation I — Certificate
Coastal Navigation II — Certificate
Marine Engineer 1st class — Certificate
Marine Engineer 2nd class — Certificate
Marine Engineer 3rd class — Certificate
Marine Engineer 4th class — Certificate
Master Mariner — Certificate
Offshore Navigation I — Certificate
Offshore Navigation II — Certificate
Watchkeeping Mate — Certificate

Comprehensive program notes and admission requirements can be obtained from:

Camosun College
Carey Road Campus
3814 Carey Road,
Victoria, British Columbia, V8Z 4C4
Telephone (604) 388-6523

Specialized Marine Programs

None

Departments, Institutes

 Biology
 Earth Sciences
 Economics
 Geography
 Law

 Department of **Biology**

 D.R. Gardner, *Chairman* (613) 564-3871

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Chordate zoology
- Evolutionary concepts
- Invertebrate zoology
- Physiology
- Community and population ecology
- Evolution and adaptation in fish
- Fish physiology
- Ichthyology
- Mammalian reproductive biology
- Mammalogy
- Quantitative ecology

Research Areas

Not available

 Department of **Earth Sciences**

 R. Ranalli, *Chairman* (613) 564-2630

Degrees B.Sc(Hons)

Courses

- Introduction to geoscience
- Marine geology and microfossils

Research Areas

Not available

 Department of **Economics**

 D.A. Smith, *Chairman* (613) 564-2641

Degrees B.A.(Hons)

Courses

- Canadian economic policies
- Economics of natural resources
- Regional economics

Research Areas

Not available

 Department of **Geography**

 A.I. Wallace, *Chairman* (613) 564-2641

Degrees B.A.(Hons)/B.Sc(Hons)/M.A.

Courses

- Contemporary geographic analysis
- Introduction to geoscience
- Transportation geography
- Floating ice studies
- Issues in canadian resource development

Research Areas

Not available

 Department of **Law**

 C.N. Sargent, *Chairman* (613) 564-7540

Degrees LL.B/LL.M

Courses

- International economic law
- Law of environmental quality
- La délimitation des espaces marins en droit international

Research Areas

Not available

Specialized Marine Programs

Marine and Small Powered Equipment Mechanic — Certificate
Marine Navigator — Certificate

Marine and Small Powered Equipment Mechanic — Certificate

Duration 40 weeks

Content

- Bearings and seals
- Blueprint reading
- Communications
- Electrical systems
- Engine service and chassis overhaul
- Fuels and carburetion
- Power trains
- Trade calculations
- Welding

Marine Navigator — Certificate

Duration 12 weeks

Content

- Astro-navigation
- Chartwork and pilotage
- Communications
- Engineering knowledge
- Industrial safety and ship management
- Masters business
- Meteorology
- Navigation instruments
- Navigation safety
- Ship construction and cargo
- Ship's knowledge
- Stability
- Time azimuth

Note: *The Canadian Coast Guard College trains marine navigation and marine engineering officers for the Canadian Coast Guard. The training program is 33 months long and consists of three periods at the College and two periods at sea leading to certification as marine officers. At the College, Officer Cadets receive all instruction in either English or French according to their choice.*

Specialized Marine Programs

Marine Engineering Officer Cadet — Certificate

Navigation Officer Cadet — Certificate

Marine Engineering Officer Cadet — Certificate

Note: The Engineering Program trains men and women to be engine-room watchkeeping officers and prepares them for certification at higher levels. A total of 9 months of sea training is included.

Courses

- Applied and fluid mechanics
- Blueprints
- Chemistry
- Control theory
- Electrotechnology
- Marine engineering
- Marine law
- Materials strength
- Mechanical training
- Metallurgy
- Naval architecture
- Refrigeration
- Rigging
- Thermodynamics

Navigation Officer Cadet — Certificate

Note: The three year course in navigation and related subjects is designed to train men and women to be Watchkeeping Officers in the Canadian Coast Guard and to prepare them for certification at higher levels later in their careers. Twelve months of sea training is included.

Duration 3 years

Courses

- Chartwork and pilotage
- Electrical engineering
- Industrial safety
- Marine engineering
- Marine law
- Meteorology
- Nautical astronomy
- Navigation
- Radar simulation
- Seamanship and cargo work
- Ship construction
- Ship management
- Signals
- Stability

Carbonear District Vocational School
P.O. Box 60,
Carbonear, Newfoundland, A0A 1T0
Telephone (709) 596-6139

CARBONEAR DISTRICT VOCATIONAL SCHOOL

CDV

Specialized Marine Programs

Fish Plant Worker — Diploma

Fish Plant Worker — Diploma

Duration 9 months

Courses

- Fish processing and preserving
- Fresh and frozen material handling
- Plant sanitation
- Shellfish identification and processing
- Shipping
- Species identification

**CENTENNIAL COLLEGE OF
APPLIED ARTS AND TECHNOLOGY**

Centennial College of Applied Arts and Technology
P.O. Box 631, Station A,
Scarborough, Ontario, M1K 5E9
Telephone (416) 694-3241/8550

Specialized Marine Programs

Marine and Small Power and Equipment Mechanic — Certificate

**Marine and Small Power and Equipment
Mechanic Program — Certificate**

Ian Cummings, *Programme Director*, Ashtonbee Campus

Duration 40 weeks

Content

- Trade theory
- Trade practical
- Machine shop
- Welding

Collège de la Gaspésie et de Îles
96 rue Jacques-Cartier
C.P. 590,
Gaspé, Québec, G0C 1R0
Téléphone (418) 385-2201

Centre spécialisé de pêches
Collège de la Gaspésie et de Îles
C.P. 220,
Grande-Rivière, Québec, G0C 1V0
Téléphone (418) 385-2241

COLLEGE DE LA GASPÉSIE ET DES ÎLES

Programmes spécialisés dans le domaine maritime

Exploitation et gestion des ressources marines — D.E.C.
Transformation des produits de la mer — D.E.C.

Exploitation et Gestion des Ressources Marines — D.E.C.

Durée 3 ans

Contenu

- Connaissance générale du bateau de pêche
- Construction et utilisation des engins de pêche
- Ecologie marine
- Electricité du bateau de pêche
- Gestion du bateau de pêche
- Ichtyologie
- Instruments de navigation
- Les chaluts
- Les équipements de pêche
- Les filets droits
- Manoeuvre du bateau
- Manutention et préservation du poisson à bord
- Moteurs marins
- Navigation
- Sécurité de la navigation
- Signalisation et radio-communication
- Stabilité du bateau
- Technologie des engins de pêche

Transformation des Produits de la Mer — D.E.C.

Durée 3 ans

Contenu

- Bactériologie des produits marins
- Biochimie des produits marins
- Commercialisation des produits marins
- Conservation du poisson
- Développement et promotion des produits marins
- Ecologie marine
- Ichtyologie
- Organisation industrielle des usines de pêches
- Stage dans un centre d'inspection des produits marins
- Stage dans une usine de transformation

Specialized Marine Programs

Remote Sensing — Diploma

Remote Sensing — Diploma

Duration 3 semesters

Courses

- Advanced digital image analysis
- Applications of aerial photography in earth resources investigations
- Remote sensing for resource management
- Remote sensing from space and airborne platforms
- Application of geographic information systems
- Cooperative project
- Drafting and graphic arts
- FORTRAN programming
- Introduction to computers
- Introduction to geographic systems
- Introduction to image processing and enhancement
- Microwave sensing
- Photogrammetry and photographic systems
- Principles of photo interpretation and remote sensing

Specialized Marine Programs

- Cartography I — Certificate
- Cartography II — Certificate
- Hydrography I — Certificate
- Hydrography II — Certificate

Cartography I — Certificate

Duration 13 weeks

Content

- Aerial photography
- Aids to navigation
- Chart amendment patches
- Chart production source data
- Compilation mosaics
- Control surveying
- Hand lettering
- Hydrographic field survey
- Map projections
- Marine cartography
- Notices to mariners
- Pen and ink drawing
- Planning new charts
- Reprographics
- Scale reduction of source data
- Sounding selection and depth contours
- Terminology and chart symbols
- Tides, currents and water levels
- Toponymy
- Vertical datum adjustments

Cartography II — Certificate

Duration 5 weeks

Content

- Aerial photography and mapping
- Charting of dredging plans
- CHS and marine cartology
- Elementary principles of navigation
- GEBCO and geoscience mapping
- Hydrographic field operations
- Hydrography and the law
- Notices to mariners
- Oceanography
- Planning and priorities
- Sailing directions
- Tides, currents and water levels

Hydrography I — Certificate

Duration 10 weeks class time

- Cartography; marine cartography; nautical charts
- Computer familiarization
- Electronic positioning systems; automation in positioning; position calculation and lattices; short, medium, long range systems
- Field data presentation
- Hydrography; aids to navigation; bottom samples; depth measurement; digital depth data; echograms; notices to mariners; sailing directions; shoal examinations; shorelining; visual positioning fixing;
- Meteorology
- Projections
- Resource mapping
- Seamanship and navigation
- Charts and compass
- Electronic aids and navigation
- Manoeuvring
- Marine radiotelephone
- Piloting
- Practical seamanship
- Safety afloat
- Survey applications
- Survey instrumentation
- Survey techniques
- Tides, currents and water levels

Hydrography II — Certificate

Duration 6 weeks

Content

- Acoustic theory and practice
- Cartography
- CHS and hydrography
- Electronic positioning systems
- Geodesy
- Geomorphology
- Hydrography
- Hydrography and the law
- Oceanography
- Photogrammetry
- Project Planning
- Surveying
- Tides, currents and water levels

Concordia University
7141 Sherbrooke Street West,
Montréal, Québec, H4B 1R6

Concordia University
1455 de Maisonneuve West,
Montréal, Québec, H3G 1M8
Telephone (514) 848-3838

Specialized Marine Programs

Ecotoxicology (Biology) — Diploma

Departments, Institutes

Biology
Civil Engineering
Geography
Economics
Geology

Department of **Biology**

Dr. Perry D. Anderson, *Director* (514) 848-3402/3391

Note: The diploma program in Ecotoxicology is designed to meet the needs of post graduate professional training for biologists and chemists who find that they increasingly require a knowledge of toxicology in their work.

Degrees Diploma

Courses

- Analytical methods in ecotoxicology
- Design of ecotoxicology studies
- Ecotoxicology
- General principles in toxicology
- Socio-economic legal and industrial aspects of environmental toxicology
- Statistical methods, epidemiological analyses and risk assessments
- Toxicodynamics and target organ disease
- Toxicokinetics and biodegradation processes

Research Areas

- Albert, P. • Effects of toxicants on sensory systems in aquatic invertebrates; use of biological controls in environmental management.
- Anderson, P. • Toxicity of pollutant mixtures; behavioural toxicology; the study of teratogens.
- Baldwin, M. • Metabolic pathways of toxicants biotransformation.
- Fairbairn, D. • Statistical methods and experimental design in population and environmental studies.
- Hogben, M. • Legal and social aspects of environmental pollution; risk assessments in environmental management.
- Langford, C. • The application of photochemistry, photoelectrochemistry and laser thermal sensing to the detection of environmental contaminants. The compartmentalization of chemical substances in aquatic ecosystems.
- Leduc, G. • Toxicity of cyanide as an aquatic contaminant; modifying factors of toxicity; sublethal effects of toxicants.

Maly, E. • Effects of toxicants at the population and community level of ecosystems; toxicity of metals to invertebrates.

Nogrady, T. • Effects of toxicants on freshwater plankton; studies of neurotoxicants.

Ruby, S. • Effects of environmental toxicants on reproductive systems, toxicity studies of industrial organic contaminants.

Widden, P. • Crude oil degradation by fungi of temperate and arctic environments.

Zienius, R. • Detection, separation and quantitation of trace metals in marine samples; chromatographic methods for the determination of organic contaminants; study of retention rates of pesticides in soil.

Department of **Civil Engineering**

Department (514) 848-7801

Degrees M.Eng/Ph.D

Courses

- Coastal engineering

Research Areas

Sarraf, S. • Ice and cold water engineering.

Department of **Economics**

Dr. F. Müller, *Chairman* (514) 848-3900

Degrees B.A.(Hons)

Courses

- Natural resource economics

Research Areas

Müller, F. • Environmental and natural resource economics with emphasis on renewable resources; fisheries of Latin America (Peru).

Department of **Geography**

Dr. I.M. Barlow, *Chairman* (514) 848-2050

Degrees B.A.(Hons)/B.Sc(Hons)

Courses

- Resource analysis
- The sea
- Tutorial in man-environment relationships I
- Tutorial in man-environment relationships II

Research Areas

Chichkian, G. • Geography of the sea.

Department of **Geology**

Telephone (514) 848-3304

Degrees B.Sc(Hons)

Courses

- Oceanography
- Plate tectonics and crustal evolution
- Stratigraphy

Research Areas

None

Specialized Marine Programs

Category I Diver — Certificate

Hyperbaric Chamber Operator — Certificate

North Sea Upgrading — Certificate

Category I Diver — Certificate

Note: This course is also offered in a modular format for students with previous advanced standings:

- Diving Module (15 weeks)
- Contaminated Water Diving Module (2 Weeks)
- Surface Welding Module (7 weeks)

Duration 24 weeks

Content

- Basic blueprint reading
- Communications
- Compressors
- Contaminated water diving theory
- Diving equipment
- Diving theory
- Electric arc welding and gas cutting
- Physiology
- Seamanship
- surface chamber and treatment tables
- Underwater hazards
- Underwater tasks
- Welding theory

Hyperbaric Chamber Operator — Certificate

Duration 2 weeks

North Sea Upgrading — Certificate

Duration 3 weeks

Specialized Marine Programs

Environmental Policy and Administration (Resource and Environmental Studies) — M.E.S./Ph.D.
 International Business (Business Administration) — M.B.A.
 Marine Affairs (Marine Affairs Program) — Diploma
 Marine and Environmental Law (Law) — LL.B/LL.M/J.S.D.
 Marine Biology (Biology) — B.Sc/M.Sc/Ph.D.
 Marine Geological Resources (Geology) — B.Sc.
 Marine Geology (Geology) — M.Sc/Ph.D.
 Oceanography (Oceanography) — M.Sc/Ph.D.
 Resource Management and Ecology (Resource and Environmental Studies) — M.E.S./Ph.D.
 Transportation (Business Administration) — M.B.A.

Departments, Institutes

Biology
 Business Administration
 Centre for Foreign Policy Studies
 Centre for Marine Geology
 Dalhousie Ocean Studies Program
 Economics
 Geology
 History
 Institute of Oceanography
 International Institute for Transportation and Ocean Policy Studies
 Law
 Lester Pearson Institute for International Development
 Marine Affairs
 Oceanography
 Physics
 Physiology and Biophysics
 Political Science
 Public Administration
 Resource and Environmental Studies
 Sociology and Social Anthropology

Department of Biology

Coordinator (902) 424-3515

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Animal nutrition
- Animal population ecology
- Aquatic microbiology
- Biological oceanography (introduction)
- Biology of algae
- Biology of phytoplankton
- Communities and ecosystems
- Ecosystem analysis
- Field ecology
- Fisheries oceanography
- Fisheries population biology
- Ichthyology
- Invertebrates
- Marine diversity

- Physiology of marine algae
- Physiology of marine animals
- Plant physiology
- Resource ecology and economic development
- Survey of fish biology
- Systematic survey of algae
- Theoretical population dynamics
- Animal nutrition
- Animal physiology
- Aquaculture
- Ecosystem analysis
- Fisheries population biology (introductory)
- Ichthyology
- Marine microbiology
- Physiology and biochemistry of marine algae
- Theoretical population dynamics

Research Areas

- Bidwell, R.G.S. • Plant physiology.
 Boutillier, R.G. • Fish biology and physiology.
 Brown, R.G. • Microbiology of scallops.
 Chapman, L.M. • Population and community, ecology of seaweeds.
 Doyle, R.W. • Evaluation and ecology and genetics, fisheries population dynamics.
 Garside, E.T. • Responses of fish to stress.
 Lane, P.A. • Ecological modelling and human ecology.
 McLaren, I.A. • Ecology of marine mammals, birds.
 Newkirk, G.F. • Marine aquaculture.
 Novitsky, J.A. • Marine microbiology.
 O'Dor, R.K. • Squid physiology.
 Scheibling, R. • Population and community ecology of marine benthos, development, nutrition, pathology of marine invertebrates.
 Whitehead, H. • Whale ecology.
 Zouros, R. • Genetics.

School of Business Administration

Coordinator (902) 424-7080

Degrees M.B.A.

Courses

- International business and ocean resources
- International transportation
- Seminar in ocean transportation

Research Areas

- Brooks, M.R. • Export marketing, international transportation marketing.
 Ellison, R.A. • Marketing and transportation.
 Patton, D.J. • International business, policy.
 Rosson, P.J. • International marketing.

Centre for Foreign Policy Studies

Dr. D.W. Middlemuss, *Director* (902) 424-3769

The Centre is concerned with teaching, research and other professional activities in various aspects of foreign policy and international politics. The work of the Centre is concentrated in the following areas: Canadian foreign policy; developmental studies;

international political economy; maritime and strategic studies. Geographical specializations include African, Chinese, European and American foreign policy.

Centre faculty offer courses in the Department of Political Science on international relations, foreign and defence policy and supervise masters and doctoral students in these fields.

Centre for Marine Geology

Dr. Matthew Salisbury, *Director* (902) 424-6461

The Centre was founded in 1983 to promote the interdisciplinary study of the continental margins and the sea floor. The Centre draws on the faculty and resources of the Departments of Geology, Oceanography and Physics. Research activities include ocean crust studies, micropaleontology and biostratigraphy, sedimentation studies and instrument development.

The objectives of the Centre are:

- 1) To expand the university's leading role in international studies of the oceanic crust
- 2) To participate with industry and government in the geological aspects of oil and gas development on Canada's east coast and
- 3) To continue research on sedimentation and the recent history of the Canadian offshore.

Dalhousie Ocean Studies Program (DOSP)

E. Gold, *Director*

DOSP has undertaken training responsibilities in the field of ocean law, policy and management in conjunction with other institutions, and participates in a wide range of conference and workshop activities in many parts of the world.

Current research activities include:

- 1) Economic zone policy and legislation studies
- 2) Marine pollution regulation studies
- 3) Canadian shipping law and policy studies
- 4) Studies of ecosystem management problems in the Gulf of Maine and Bay of Fundy
- 5) Nova Scotia rural coastal community studies
- 6) Maritime boundary delimitation studies
- 7) Studies of ocean law, policy and management in the Eastern Caribbean
- 8) bibliographical services in ocean law, policy and management.

Department of Economics

Department (902) 424-2026

Degrees B.A.(Hons)

Courses

- Resource economics

Research Areas

Cross, M.L. • Impact of property rights on natural resource use, particularly marine resources and aquaculture.

Gordon, D. • Fisheries economics.

Mazany, R.L. • Fish marketing, fisheries economics.

McAllister, R.I. • Economic development and the use of marine resources.

Osberg, L. • Development of Newfoundland offshore oil industry.

Department of Geology

Coordinator (902) 424-2355

Note: Graduate work is possible in the following areas: marine geophysics, oceanic basements, offshore hydrocarbon provinces, coastal sediments, micropaleontology and igneous petrology.

Degrees B.Sc.(Hons)/M.Sc./Ph.D

Courses

- Applied geophysics
- General geophysics
- Marine geophysics
- Pleistocene biogeography
- Sedimentology and biostratigraphy
- Tectonics
- Applied geophysics
- Geodynamics
- Geophysics (advanced topics)
- Geophysics (seminar)
- Micropalaeontology (research topics)
- Sedimentology and stratigraphy (seminar)
- Soft rock geology (research topics)

Research Areas

Boyd, R. • Sedimentary geology, coastal processes.

Gibling, M.R. • Sedimentary geology.

Hall, J.M. • Paleomagnetism, coastal structure.

Medidi, F. • Micropaleontology.

Robinson, P.T. • Petrology, coastal structure.

Ryall, P.J.C. • Marine geophysics and paleomagnetism.

Salisbury, M.H. • Geophysics, physical of rocks.

Schenk, P.E. • Carbonates, deep sea sediments.

Scott, D.B. • Micropaleontology.

Department of History

Department (902) 424-2011

Degrees B.A.(Hons)

Courses

- History of seafaring

Research Areas

Fingard, J. • Seafaring labour during the ages of sail and steam.

Armour, G. • Operations of sailing ships in the Maritimes.

Institute of Oceanography

A.J. Bowen, *Director*

The Institute is supported through grants from the National Research Council of Canada. It forms part of a major marine research establishment in the Halifax area and maintains the Aquatron Laboratory, a marine research facility containing large seawater tanks and controlled-environment labs. The facility is available to researchers from universities, governments, and the private sector.

International Institute for Transportation and Ocean Policy Studies (ITOPS)

John Gratwick, *Executive Director* (902) 424-6557

The Institute is an independent organization which maintains a close affiliation with Dalhousie University and links to several schools and institutes within the university. Areas of expertise include marine transportation, marine and environmental law, ocean law policy and management studies. Short-term training activities have been developed in boundary making, marine technology in the power and propulsion of ships, and alternatives to national shipping fleets for developing countries.

Faculty of **Law**

Bruce Wildsmith, *Director* (902) 424-3495

Degrees LL.B/LL.M/J.S.D.

Courses

- Admiralty (introduction)
- Carriage of goods by sea
- Comparative marine law and policy
- Environmental law (Canadian environmental law)
- Environmental law (international environmental law)
- Fisheries law
- Law of the sea
- Marine insurance law
- Maritime collision and salvage
- Constitutional law
- International law
- Oil and Gas law

Research Areas

Gold, E. • Shipping and marine pollution.

Kindred, H.M. • Shipping and transportation.

MacDonald, R. St. J. • International law.

Spicer, W.W. • Maritime Law.

Townsend-Gault, I. • Natural resources law, marine and environmental law and policy.

VanderZwaag, D.L. • Marine and environmental law and policy.

Wildsmith, B.H. • Fisheries law, aquaculture.

Lester Pearson Institute for International Development

Director (902) 424-2142

Founded in 1985, the Institute is intended to enhance Dalhousie's role in development studies, education and projects, and to promote Dalhousie's Third World activities in collaboration with established development centres and agencies. Major activities include public lectures and conferences, seminar series, applied and theoretical research, publications, training programs and input into public policy on Canada's role in international development. The Institute hosts an International Ocean Institute (IOI) training course that is held annually in the summer.

Marine Affairs Program

Melissa White, *Administrative Officer* (902) 424-3555

Note: The one-year graduate Diploma program in Marine Affairs provides for the integration of students into regular courses at Dalhousie and cooperating institutions. Students are streamed into

program options specific to their needs. Program streams include: marine law, policy and administration; marine technology and business; and marine science and management

Degrees Diploma

Courses

- Introduction to marine affairs (International Ocean Institute training course 10 weeks)
- Introduction to marine science (for participants without a science background)
- Marine affairs I
- Marine affairs II

Research Areas

(See specific departments)

Department of **Oceanography**

Department (902) 424-3557

Degrees M.Sc./Ph.D

Courses

- Benthic ecology
- Biological oceanography (introduction)
- Biology of phytoplankton
- Chemical oceanography (introduction)
- Dynamic meteorology
- Estuary, coast and shelf dynamics
- Fisheries oceanography
- Fluid dynamics
- Geological oceanography (introduction)
- History of oceanography
- Marine modelling
- Ocean dynamics
- Ocean waves
- Oceanography (introduction)
- Physical and chemical oceanography (introduction)
- Physical oceanography (introduction)
- Time series analysis
- Time series analysis in oceanography

Research Areas

Beaumont, C. • Geological oceanography, geophysics.

Bowen, A.J. • Physical oceanography, nearshore dynamics, sediment transport.

Boyd, C.M. • Biological oceanography, zooplankton ecology and physiology.

Cooke, R.C. • Chemical oceanography, physical chemistry of seawater.

Fournier, R.O. • Biological oceanography, phytoplankton ecology.

Garrett, C.J.R. • Physical oceanography, geophysical fluid dynamics.

Huntley, D.A. • Physical oceanography, turbulence, boundary layers, nearshore processes.

Johnson, B.D. • Chemical oceanography, surface chemicals and bubbles.

Koslow, J.A. • Biological oceanography, fisheries oceanography.

Lewis, M.R. • Biological oceanography physical interactions, phytoplankton ecology.

Louden, K.E. • Geological oceanography, marine geophysics.

- Mayer, L.A. • Geological oceanography, marine geology and geophysics.
 Mills, E.L. • Biological oceanography, benthic ecology, history of marine science.
 Moore, R.M. • Chemical oceanography, trace element geochemistry and Arctic oceanography.
 Ruddick, B.R. • Physical oceanography, oceanic mixing processes, internal waves, geophysical flows.
 Thompson, K.R. • Physical oceanography, ocean circulation, sea level variations.
 Wangersky, P.J. • Chemical oceanography, biogeochemistry.

Department of **Physics**

Department (902) 424-2337

Degrees B.Sc(Hons)

Courses

- Atmospheric physics
- General meteorology
- Synoptic meteorology

Research Areas

None

Department of **Physiology and Biophysics**

Department (902) 424-3517

Courses

None

Research Areas

- Holland, J.G. • Carbon monoxide poisoning in relation to deep sea diving.

Department of **Political Science**

Department (902) 424-2396

Degrees B.A.(Hons)

Courses

- Canadian defence policy
- Politics of the environment
- Politics of the sea

Research Areas

- Boardman, R. • Politics of the environment, oceans, international law.
 Mann Borgese, E. • Law of the sea, marine resources and ocean management in the international environment.
 Dowdy, W.L. • Indian Ocean naval policy.
 Middlemiss, D.W. • Canadian naval policy.

School of **Public Administration**

Director (902) 424-3742

Degrees M.P.A.

Courses

- Natural resource administration
- Politics and administration of fisheries management

Research Areas

- Pross, A.P. • Coastal zone management, fisheries policy, institutional frameworks for coastal zone management in Atlantic Canada, problems of policy coordination amongst agencies involved in resource administration.

School of **Resource and Environmental Studies**

Department (902) 424-3632

Degrees M.E.S./Ph.D

Courses

- Environmental assessment
- Fisheries resource management
- Management of the marine environment
- Management of toxic substances
- Resource systems and economic development

Research Areas

- Beanlands, G.E.E. • Environmental impact assessment.
 Cohen, F. • Native people and resource issues, social impact assessment.
 Cote, R. • Management of toxic chemicals, marine environmental protection strategies.
 Hanson, A.J. • Coastal area management and planning, resource conservation.
 Lamson, C. • Coastal communities, fishing and Arctic policy making.
 Taschereau, P. • Ecological reserves.

Department of **Sociology and Social Anthropology**

Department (902) 424-6593

Degrees B.A.(Hons)/M.A.

Courses

- Canadian society
- Coastal communities

Research Areas

- Apostle, R. • Fish processing plants and the organization of fish production.
 Barber, P. • Role of women in the fishery.
 Binkley, M. • Occupational health and safety in the Atlantic fishery.
 Kasdan, L. • Cultural role of fishing as a way of life.
 Thiessen, V. • Canadian public policy in relationship to the licensing and management of ocean resources.

TRANSPORT CANADA TRAINING INSTITUTE

Telecommunications and Electronics Centre
1950 Montreal Road, Bag Service 5400,
Cornwall, Ontario, K6H 6L2
Telephone (613) 938-4100

Maritime Training Centre
1950 Montreal Road,
Cornwall, Ontario, K6H 6L2
Telephone (613) 938-4300

Specialized Marine Programs

Administration for Coast Guard Ships Officers — Certificate
Command Certificate — Certificate
Communications Control Systems Sperry — Certificate
Continuous Marine Broadcast (CMB) — Certificate
Distress Procedures Refresher — Certificate
Gyro-Compass — Certificate
Ice Interpretation — Certificate
Lifeboat Coxswain — Certificate
Marine FM (ME-60 and ON-56) — Certificate
Marine Radio Operations — Certificate
Marine Refrigeration and Air Conditioning — Certificate
Marine Single Sideband — Certificate
Marine Traffic Regulator Training Program — Certificate
Nautel 1kw Communications Transmitter — Certificate
Oil and Water Treatment — Certificate
Orientation Course for Coast Guard Radio Operators — Certificate
Radio Operations — Certificate
Search and Rescue — Certificate
SEN/ARPA for Nautical Surveyors — Certificate
Shipboard Radars — Certificate
Ship Storekeeper/Clerk — Certificate
Simulated Electronic Navigation — Certificate

Administration for Coast Guard Ships Officers — Certificate
Duration 20 days
Content Not available

Command Certificate — Certificate
Duration 85 days
Content Not available

Communications Control Systems Sperry — Certificate
Duration 8 days
Content Not available

Continuous Marine Broadcast (CMB) — Certificate
Duration 7 days
Content Not available

Distress Procedures Refresher — Certificate
Duration 5 days
Content Not available

Gyro-Compass — Certificate
Duration 6 days
Content Not available

Ice Interpretation — Certificate
Duration 5 days
Content Not available

Lifeboat Coxswain — Certificate
Duration 34 days
Content Not available

Marine FM (ME-60 and ON-56) — Certificate
Duration 8 days
Content Not available

Marine Radio Operations — Certificate
Duration 140 days
Content Not available

Marine Refrigeration and Air Conditioning — Certificate
Duration 20 days
Content Not available

Marine Single Sideband — Certificate
Duration 30 days
Content Not available

Marine Traffic Regulator Training Program — Certificate

Duration 1-2 weeks
Content Not available

Nautel 1 kw Communications Transmitter — Certificate

Duration 8 days
Content Not available

Oil and Water Treatment — Certificate

Duration 10 days
Content Not available

Orientation for Coast Guard Radio Operators — Certificate

Duration 4 days
Content Not available

Radio Operations — Certificate

Duration 70 days
Content Not available

Search and Rescue — Certificate

Duration 15 days
Content Not available

SEN/ARPA for Nautical Surveyors — Certificate

Duration 10 days
Content Not available

Shipboard Radars — Certificate

Duration 13 days
Content Not available

Ship Storekeeper/Clerk — Certificate

Duration 40 days
Content Not available

Simulated Electronic Navigation — Certificate

Duration 10 days
Content Not available

Specialized Marine Programs

Marine Diesel Mechanic — Certificate

Marine Diesel Mechanic — Certificate

Duration 9 months

Content

- Electrical system service
- Equipment selection, use and maintenance
- Exhaust and fuel system service
- Skill development

Specialized Marine Programs:

- Able Fisherman — Certificate
- Aquaculture — Certificate
- Basic Diesel Engines — Certificate
- Chief Engineer of Motor-Driven Fishing Vessel — Certificate
- Command Endorsement — Certificate
- Diesel Engines — Certificate
- Electronic Navigation — Certificate
- Fishing Gear I — Certificate
- Fishing Gear II — Certificate
- Fishing Master, Class IV — Certificate
- Fishing Master, Class III — Certificate
- Fishing Master, Class II — Certificate
- Fishing Master, Class I — Certificate
- Gas Engines — Certificate
- Gas Engines Maintenance — Certificate
- Hydraulics — Certificate
- Introduction to Navigation — Certificate
- Marine Engineer, 4th Class Motor — Certificate
- Marine Engineer, 3rd Class Motor — Certificate
- Marine Emergency Duties I — Certificate
- Marine Emergency Duties II — Certificate
- Master Ferry Steamship (Short Run) — Certificate
- Master Minor Waters — Certificate
- Master of Small Craft and Master of Small Passenger Craft — Certificate
- Watchkeeping Engineer — Certificate
- Watchkeeping Mate — Certificate
- Welding I — Certificate
- Welding II — Certificate

Able Fisherman — Certificate

Duration 2 years

Content

- Care of fish
- Chartwork and pilotage
- Engineering
- Fishing gear
- General seamanship
- Hydraulics
- Ichthyology and crustaceans
- Industrial safety
- Introduction to electricity
- Introduction to welding
- Marine emergency duties I and II
- Mathematics
- Navigation instruments
- Oceanography
- Radio-telephone
- Water safety

Aquaculture — Certificate

Duration 3 weeks

Content

- Fishing gear
- Mollusca
- Lifesaving
- Water safety

Basic Diesel Engines — Certificate

Duration 2 weeks

Content

- Engine room safety
- General knowledge
- Maintenance
- Tools

Chief Engineer of Motor-Driven Fishing Vessel — Certificate

Duration 20 weeks

Content

- Auxiliary steam machinery
- Diesel engine
- Electrical systems
- Engine construction and operation
- Hydraulics
- Marine emergency duties II
- Mathematics and physics
- Pollution prevention
- Refrigeration
- Water safety

Command Endorsement (350 tons) — Certificate

Duration 36 weeks

Content

- Chartwork and pilotage
- General seamanship
- Meteorology
- Ship management

Diesel Engines — Certificate

Duration 7 weeks

Content

- Carburation
- Electrical systems
- Engine room safety
- Marine diesel engines
- Marine emergency duties I
- Operation, maintenance and repairs
- Water safety

Electronic Navigation — Certificate

Duration 2 weeks

Content

- Compass
- Loran C.
- Radar basics
- Radio-telephone MF and VHF

Fishing Gear I — Certificate

Duration 6 weeks

Content

- Knots
- Marine emergency duties I
- Mathematics
- Net assembly
- Net mending
- Splicing
- Trap assembly
- Water safety

Fishing Gear II — Certificate

Duration 5 weeks

Content

- Construction and repair of seine and trawls
- Cutting and assembly
- Mathematics
- Splicing, knots and net mending revision
- Water safety

Fishing Master, Class IV — Certificate

Duration 8 weeks

Content

- Chartwork and pilotage
- General seamanship
- Navigating instruments
- Navigation safety

Fishing Master, Class III — Certificate

Duration 12 weeks

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Navigating instruments
- Navigation safety

Fishing Master, Class II — Certificate

Duration 12 weeks

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigating instruments
- Navigation safety
- Ship management

Fishing Master, Class I — Certificate

Duration 20 weeks

Content

- Astro navigation
- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigation safety

Gas Engines — Certificate

Duration 7 weeks

Content

- Carburation system
- Dismantling and assembly
- Electrical systems
- Marine emergency duties I
- Motor mechanics
- Operation, maintenance and repairs
- Water safety

Gas Engines Maintenance — Certificate

Duration 1 week

Content

- Emergency repairs at sea
- Fuel safety
- Gasoline engines
- Pre-sea departure requirements

Hydraulics — Certificate

Duration 2 weeks

Content

- Basic theory
- Hoses and fittings
- Hydraulic circuit and systems
- Pumps, motors, control valves, cylinders

Introduction to Navigation — Certificate

Duration 4 weeks

Content

- Chartwork and pilotage
- Marine emergency duties I
- Navigation instruments

- Radio-telephone
- Safety navigation

Marine Engineer, 4th Class Motor — Certificate

Duration 20 weeks

Content

- Auxiliary steam machinery
- Diesel engine
- Electrical systems
- Engine construction and operation
- General knowledge
- Hydraulics
- Instruments for measuring and testing
- Marine emergency duties II
- Pollution prevention
- Refrigeration
- Water safety

Marine Engineer, 3rd Class Motor — Certificate

Duration 20 weeks

Content

- Applied mathematics
- Carburation
- Engineering knowledge
- Hydraulics
- Operation and construction
- Pumping
- Refrigeration
- Water safety

Marine Emergency Duties I — Certificate

Duration 1 week

Content

- Firefighting
- Lifesaving appliances
- Rescue and survival
- Safety oriented first aid

Marine Emergency Duties II — Certificate

Duration 3 weeks

Content

- Firefighting
- Lifesaving appliances
- Rescue and survival
- Standard first aid — safety oriented

Master Ferry Steamship (Short Run) — Certificate

Duration 12 weeks

Content

- Chartwork and pilotage
- Oral and practical
- Ship's business

Master Minor Waters — Certificate

Duration 20 weeks

Content

- Chartwork and pilotage
- Oral and practical
- Ship's business

**Master of Small Craft and
Master of Small Passenger Craft** — Certificate

Duration 4 weeks

Content

- Chartwork and pilotage
- Oral and written
- Ship's business

Watchkeeping Engineer — Certificate

Duration 8 weeks

Content

- Engine room safety
- Marine diesel engines
- Marine emergency duties II
- Mathematics and physics
- Pumping
- Shafting
- Water safety

Watchkeeping Mate — Certificate

Duration 30 weeks

Content

- Chartwork and pilotage
- General seamanship
- General ship knowledge
- Navigation instruments
- Navigation safety

Welding I — Certificate

Duration 4 weeks

Content

- General knowledge of welding
- Oxyacetylene and electric welding
- Safety
- Use of various kinds and sizes of rods
- Water safety

Welding II — Certificate

Duration 5 weeks

Content

- Aluminum welding
- Brass and silver solder
- Cutting
- Oxyacetylene welding
- Safety
- Tools
- Water safety

ÉCOLE DES PÊCHES DU NOUVEAU-BRUNSWICK

Ecole de Pêches du Nouveau-Brunswick
C.P. 178,
Caraquet, Nouveau-Brunswick, E0B 1K0
Téléphone (506) 727-6531

Programmes spécialisés dans le domaine maritime

Aquaculture, Huîtres et Moules — Certificat
 Capitaine d'Eaux Secondaires — Certificat
 Capitaine de Pêche, Classe I — Certificat
 Capitaine de Pêche, Classe II — Certificat
 Capitaine de Pêche, Classe III — Certificat
 Capitaine de Pêche, Classe IV — Certificat
 Capitaine de petite embarcation ou de petite
 embarcation à passagers — Certificat
 Capitaine d'un Transbordeur à Vapeur — Certificat
 Chef Mécanicien de Bateau de Pêche — Certificat
 Engins de Pêche I — Certificat
 Engins de Pêche II — Certificat
 Fonctions d'Urgence en Mer I — Certificat
 Fonctions d'Urgence en Mer II — Certificat
 Hydraulique — Certificat
 Initiation à la Navigation — Certificat
 Initiation au moteur diesel — Certificat
 Lieutenant de Quart — Certificat
 Maintenance de moteur à essence — Certificat
 Mécanicien de Quart de Bateau de Pêche — Certificat
 Mention de Commandement (350 tonnes) — Certificat
 Moteurs à Essence — Certificat
 Moteurs Diesel — Certificat
 Navigation Electronique — Certificat
 Officier Mécanique, 4e Class Moteur — Certificat
 Officier Mécanique, 3e Class Moteur — Certificat
 Pêcheur Professionnel — Certificat
 Soudure I — Certificat
 Soudure II — Certificat

Aquaculture, Huîtres et Moules — Certificat

Durée 3 semaines

Contenu

- Engins de Pêche
- Mollusques
- Priorité
- Sécurité

Capitaine d'Eaux Secondaires — Certificat

Durée 20 semaines

Contenu

- Affaires et connaissances du navire
- Oral et pratique
- Usage des cartes et pilotage

Capitaine de Pêche, Classe I — Certificat

Durée 20 semaines

Contenu

- Communications
- Connaissance générale du navire
- Météorologie
- Navigation
- Notions générales de matelotage
- Sécurité de la navigation
- Usage des cartes et pilotage

Capitaine de Pêche, Class II — Certificat

Durée 12 semaines

Contenu

- Communications
- Connaissance générale du navire
- Gestion du navire
- Instruments de navigation
- Météorologie
- Notions générales de matelotage
- Sécurité de la navigation
- Usage des cartes et pilotage

Capitaine de Pêche, Classe III — Certificat

Durée 12 semaines

Contenu

- Communications
- Connaissance générale du navire
- Instruments de navigation
- Notions générales de matelotage
- Sécurité de la navigation
- Usage des cartes et pilotage

Capitaine de Pêche, Classe IV — Certificat

Durée 8 semaines

Contenu

- Instruments de navigation
- Notions de matelotage et de manoeuvre
- Sécurité de la navigation
- Usage des cartes et pilotage

Capitaine de petite embarcation ou de petite embarcation à passagers — Certificat

Durée 4 semaines

Contenu

- Affaires et connaissances du navire
- Oral et pratique
- Usage des cartes et pilotage

Capitaine d'un Transbordeur à Vapeur — Certificat

Durée 12 semaines

Contenu

- Affaires et connaissances du navire
- Oral et pratique
- Usages des cartes et pilotage

Chef Mécanicien de Bateau de Pêche — Certificat

Durée 20 semaines

Contenu

- Connaissance générale en mécanique
- Fonctions d'urgence en mer II
- Hydraulique
- Moteur auxiliaire à vapeur
- Moteur principal et auxiliaire
- Opération et construction
- Prévention de la pollution
- Réfrigération
- Sécurité aquatique
- Système électrique

Engins de Pêche I — Certificat

Durée 6 semaines

Contenu

- Eppisures
- Fonctions d'urgence en mer I
- Montage de casiers
- Montage de filets
- Noeuds
- Racommodage
- Sécurité aquatique

Engins de Pêche II — Certificat

Durée 5 semaines

Contenu

- Connaissances approfondies sur la construction et la réparation des seines et chaluts
- Découpage et assemblage
- Révision des épissures, noeuds et raccomodage
- Sécurité aquatique

Fonctions d'Urgence en Mer I — Certificat

Durée 1 semaine

Contenu

- Engins de sauvetage
- Lutte et prévention des incendies
- Sauvetage et survie
- Secourisme d'urgence orienté vers la sécurité

Fonction d'Urgence en Mer II — Certificat

Durée 3 semaines

Contenu

- Engins de sauvetage
- Lutte et prévention des incendies
- Sauvetage et survie
- Secourisme d'urgence orienté vers la sécurité

Hydraulique — Certificat

Durée 2 semaines

Contenu

- Assemblage de boyaux hydrauliques
- Connaissances générales
- Genres de circuits et systèmes hydrauliques employés dans l'industrie de la pêche
- Pompes, moteurs, valves, cylindres

Initiation à la Navigation — Certificat

Durée 4 semaines

Contenu

- Fonctions d'urgence en mer I
- Instruments de navigation
- Radio-téléphone
- Sécurité de la navigation
- Usage des cartes et pilotage

Initiation au Moteur Diesel — Certificat

Durée 2 semaines

Contenu

- Connaissances générales du moteur
- Entretien
- Outils
- Sécurité dans la chambre moteur

Lieutenant de Quart — Certificat

Durée 3 semaines

Contenu

- Connaissances générale du navire
- Instruments de navigation
- Notions générales de matelotage
- Sécurité de la navigation
- Usages des cartes et pilotage

Maintenance de Moteur à Essence — Certificat

Durée 1 semaine

Contenu

- Dépannage en mer
- Description d'un moteur à essence
- Exigences avant de partir en mer
- Sécurité concernant l'essence

Mécanicien de Quart de Bateau de Pêche — Certificat

Durée 8 semaines

Contenu

- Arbre de l'hélice
- Fonctions d'urgence en mer I
- Moteurs diesel
- Opération pratique dans une salle de moteurs
- Sécurité aquatique
- Sécurité dans une salle de moteurs
- Systèmes de pompage, de démarrage, de combustible

Mention de Commandement (350 tonnes) — Certificat

Durée 36 semaines

Contenu

- Gestion du navire
- Météorologie
- Notion de matelotage
- Usage des cartes et pilotage

Moteurs à Essence — Certificat

Durée 7 semaines

Contenu

- Carburant
- Connaissances générales du moteur
- Démontage et remontage d'un moteur
- Fonctions d'urgence en mer I
- Opération, entretien et réparation
- Sécurité aquatique
- Système électrique

Moteur Diesel — Certificat

Durée 7 semaines

Contenu

- Carburant
- Connaissances générales du moteur
- Démontage et remontage d'un moteur
- Fonctions d'urgence en mer I
- Opération, entretien et réparation
- Sécurité aquatique
- Système électrique

Navigation Electronique — Certificat

Durée 2 semaines

Contenu

- Compas
- Loran C
- Notions de radar
- Radio-téléphone MF et VHF

Officier Mécanique, 4e Classe Moteur — Certificat

Durée 20 semaines

Contenu

- Connaissance générale en mécanique
- Fonctions d'urgence en mer II
- Hydraulique
- Instruments d'appareils de mesure et d'épreuve
- Mathématiques et physique
- Moteur auxiliaire à vapeur
- Moteur principal et auxiliaire
- Opération et construction
- Prévention de la pollution
- Réfrigération
- Sécurité aquatique
- Système électrique

Officier Mécanique, 3e Classe Moteur — Certificat

Durée 20 semaines

Contenu

- Carburant
- Connaissance en mécanique, général
- Connaissance en mécanique, moteur
- Hydraulique
- Mathématique
- Opération et construction
- Pompes
- Réfrigération
- Sécurité aquatique

Pêcheur Professionnel — Certificat

Durée 2 ans

Contenu

- Engins de pêche
- Fonctions d'urgence en mer I et II
- Hydraulique
- Ichthyologie et crustacés
- Initiation à l'électricité
- Instruments de navigation
- Mathématiques
- Mécanique
- Notions de matelotage et de manoeuvre
- Notions de soudure
- Océanographie
- Radiotéléphone
- Sécurité aquatique
- Sécurité industrielle
- Soins du poisson
- Usage des cartes et pilotage

Soudure I — Certificat

Durée 4 semaines

Contenu

- Connaissances générales de soudure
- Sécurité aquatique
- Sécurité en soudure
- Soudage à l'acétylène et à l'arc électrique
- Utilisation de différentes sortes et genres de baguettes

Soudure II — Certificat

Durée 5 semaines

Contenu

- Brasure et soudure à l'argent
- Coupe des métaux
- Outils
- Sécurité aquatique
- Sécurité en soudure
- Soudure autogène au gaz
- Soudure à l'aluminium

Fanshawe College
1460 Oxford Street East
P.O. Box 4005,
London, Ontario, N5W 5H1
Telephone (519) 452-4277/4100

FANSHAWE COLLEGE

Specialized Marine Programs

Marine and Small Powered Equipment Mechanic — Certificate

Marine and Small Powered Equipment Mechanic — Certificate

Note: This program is offered at the James N. Allan Campus,
Ireland Road, Simcoe, Ontario.

Duration 40 weeks

Content

- Basic electricity
- Machine shop
- Marine rigging
- Outboard motors
- Trade practical
- Welding

Specialized Marine Programs

None

Departments, Institutes

 Biology
 Economics
 Geology

 Department of **Biology**

 Dr. M. Weisbart, *Chairman* (902) 867-2294

Degrees B.Sc(Hons)/M.Sc

Courses

- Introductory ecology
- Invertebrates
- Vertebrates
- Aquatic phycology
- Marine phycology

Research Areas

Blouw, D.M. • Anadromous fishes, resource assessment, genetics.

Garbary, D.J. • Marine ecology, algae taxonomy and systematics.

Marshall, W.S. • Marine fish physiology, biophysics of marine environments.

Weisbart, M. • Anadromous fishes, fish biochemistry and physiology.

 Department of **Economics**

 Dr. S. El-Sheikh, *Chairman* (902) 867-2127

Degrees B.A.(Hons)/B.B.A.(Hons)

Courses

- Maritime regional economics

Research Areas

None

 Department of **Geology**

 Dr. W.S. Shaw, *Chairman* (902) 867-2154

Degrees B.Sc(Hons)

Courses

- Oceanography and marine geology

Research Areas

None

Specialized Marine Programs

Command Endorsements (all levels) — Certificate
Fishing Master 1st Class — Certificate
Fishing Master 2nd Class — Certificate
Fishing Master 3rd Class — Certificate
Fishing Master 4th Class — Certificate
Marine and Small Powered Equipment Mechanic — Certificate
Marine Emergency Duties I — Certificate
Marine Engineer 4th Class — Certificate
Marine Engineering Technology — Diploma
Marine Navigation Technology — Diploma
Master Mariner (all levels) — Certificate
Master Minor Waters (all levels) — Certificate
Master Small Craft (all levels) — Certificate
Watchkeeping Mate (all levels) — Certificate

Command Endorsement — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Fishing Master — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Marine and Small Powered Equipment Mechanic — Certificate

Note: Offered in Orillia only. Contact: Georgian College,

825 Memorial Avenue, Orillia, Ontario, L3V 6S2,

Telephone (705) 325-2705 ext. 245

Duration 40 weeks

Content Not available

Marine Emergency Duties I — Certificate

Duration 1 week

Content

- Firefighting
- Lifesaving appliances
- Survival

Marine Engineer 4th Class — Certificate

Duration 10 weeks

Content

- Applied mechanics
- Electrotechnology
- Engineering
- Naval architecture

Marine Engineering Technology — Diploma

Duration 6 semesters plus 3 co-op work terms

Courses

- Applied mechanics
- Automation and controls
- Blueprint reading and technical freehand sketching
- Chemistry
- Communications
- Electrotechnology
- First aid
- Log book
- Machine Shop
- Manpower management
- Marine emergency duties
- Marine law
- Marine power systems
- Mathematics
- Naval architecture
- Pre-sea safety training
- Refrigeration and air conditioning
- Skills training (fitting and overhauling)
- Skills training (major skills training)
- Thermodynamics
- Welding

Marine Navigation Technology — Diploma

Duration 6 semesters including 3 co-op work terms

Courses

- Applied mechanics
- Astro navigation
- Celestial navigation
- Chartwork
- Computer programming
- Computer technology
- Electricity and electronics
- Electricity and magnetism
- Electronics
- Engineering knowledge
- General ship knowledge
- Human relations
- Labour relations
- Marine emergency duties
- Mathematics
- Meteorology
- Naval architecture
- Navigation aids and instruments
- Navigational safety
- Physics
- Pre-sea training
- Seamanship
- Ship construction
- Shop management
- Signals and communications
- Stability
- Strength of materials
- Technical report writing

Master Mariner — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Master Minor Waters — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Master Small Craft — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Watchkeeping Mate — Certificate

Note: Certification offered at all levels.

Duration 12 weeks

Content Not available

Specialized Marine Programs

Fisheries Biology (Zoology) — B.Sc
Marine Biology (Zoology) — B.Sc

Departments, Institutes

Geology
Huntsman Marine Laboratories
Pathology
Zoology

Department of Geology

Dr. B.D. Kay, *Chairman*
Degrees B.Sc

Courses

- Structure and tectonics

Research Areas

Chesworth, W. • Oceanic islands; weathering in ocean environments.

Huntsman Marine Laboratories (HML)

Brandy Cove
St. Andrew's, New Brunswick, E0G 2X0
Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Department of Pathology

Dr. R.M. Miller, *Chairman*
Degrees B.Sc/M.Sc/Ph.D

Courses

- Diseases of aquatic animals
- Diseases of non-domestic animals
- Fish husbandry and preventive medicine
- Applied pathology of fish
- Comparative veterinary pathology

Research Areas

Geraci, J.R. • Marine mammal physiology, husbandry and reaction to environmental pollutants.

Department of Zoology

Dr. R.C. Anderson, *Chairman*
Degrees B.Sc/M.Sc/Ph.D

Courses

- Fish and wildlife management
- Fisheries science
- Ichthyology
- Invertebrate zoology
- Limnology and oceanology
- Marine biology and oceanography
- Marine environment
- Marine resource utilisation
- Vertebrate and invertebrate anatomy
- Vertebrate zoology
- Wildlife parasitology
- Advanced ichthyology
- Advanced parasitology
- Advanced zoology
- Aquaculture
- Marine mammal ecology and paleoecology
- Morphological and biochemical systemics

Research Areas

- Balon, E.K. • Developmental and evolutionary biology, epigenetics and ecology of fishes.
- Beamish, F.W.H. • Anadromous fishes, aquaculture, fisheries assessment, nutrition, productivity, marine resource assessment.
- Beverley-Burton, M. • Helminthology, fish parasitology.
- Corey, S. • Reproductive strategies of marine invertebrates, crustaceans.
- Ferguson, M.M. • Genetics, evolution of fishes.
- Gaskin, D.E. • Marine mammals, marine resource management.
- Lavigne, D.M. • Marine mammals, marine resource management.
- MacCrimmon, H.R. • Fish biology, aquaculture, fisheries management, integrated resources development.
- Noakes, D.L.G. • Ichthyology.
- Nudds, T.D. • Evolutionary and applied ecology of water fowl.
- Lynn, D.H. • Molecular evolution and ecology of invertebrates, taxonomy and systematics of marine environments.
- Roff, J.C. • Marine plankton ecology.
- Renald, K. • Eco-physiology of seals, conservation strategies, resource assessment.
- Sprague, J.B. • Fish toxicology.
- Stevens, D.E. • Fish and muscle physiology, tuna biology.
- Thomas, V.G. • Avian and mammalian nutrition and energetics, ecology of Arctic wildlife species.

Holland College
Marine Centre, 100 Water Street
Summerside, Prince Edward Island, C1N 1A9
Telephone (902) 436-7261 ext. 444; (902) 436-7268

Specialized Marine Programs:

Fisheries Technology — Certificate
Fishing Master 4th Class — Certificate
Fishing Master 3rd Class — Certificate
Fishing Master 2nd Class — Certificate
Fishing Master 1st Class — Certificate
Marine Engineer 4th Class — Certificate
Marine Engineer 3rd Class — Certificate
Marine Engineer 2nd Class — Certificate
Marine Engineer 1st Class — Certificate
Marine Emergency Duties I — Certificate
Marine Emergency Duties II — Certificate
Marine Emergency Duties III — Certificate
Master Mariner — Certificate
Master Minor Waters — Certificate
Power Engineer Refrigeration — Certificate
Watchkeeping Engineer — Certificate
Watchkeeping Mate — Certificate

Fisheries Technology — Certificate

Duration 2 years

Content

- Federal and provincial regulations
- Fish and shellfish preserving and processing
- Fish biology and processing implications
- Loading, unloading and transportation techniques
- Marketing
- Production supervision
- Quality control and sanitation
- Species identification

Fishing Master 4th Class — Certificate

Fishing Master 3rd Class — Certificate

Fishing Master 2nd Class — Certificate

Fishing Master 1st Class — Certificate

Note: Students are prepared for Canadian Coast Guard examinations for these certificates.

Duration not available

Content

Not available

Marine Engineer 4th Class — Certificate

Marine Engineer 3rd Class — Certificate

Marine Engineer 2nd Class — Certificate

Marine Engineer 1st Class — Certificate

Note: Students can qualify for certification from Transport Canada.

Duration not available

Content

Not available

Marine Engineering — Course

Note: Course will provide the skills and knowledge required to do the work of a Marine Engineer Assistant of Engine Room Rating. Course also provides an entry point for students wishing to pursue a career in Marine Engineering.

Duration 36 weeks

Content

Not available

Marine Emergency Duties I — Certificate

Marine Emergency Duties II — Certificate

Marine Emergency Duties III — Certificate

Duration not available

Content

- First aid
- Fire fighting
- Lifesaving appliances
- Rescue
- Survival

Master Mariner — Certificate

Note: Students are prepared for Canadian Coast Guard examination for this certificate.

Duration not available

Content

Not available

Master Minor Waters — Certificate

Note: Students are prepared for Canadian Coast Guard examinations for this certificate.

Duration not available

Content

Not available

Power Engineer Refrigeration — Certificate

Duration not available

Content

Not available

Watchkeeping Engineer — Certificate

Note: Students can qualify for certification from Transport Canada.

Duration not available

Content

Not available

Watchkeeping Mate — Certificate

Note: Students can qualify for certification from Transport Canada.

Duration not available

Content

Not available

Other Training Courses

Note: The Marine Centre can respond to needs for many types of marine training. Short courses can be arranged at the Marine Centre or "on site" in the following areas:

- Automatic radar plotting aids (ARPA)
- Basic navigation (40 ton master)
- Boat engine emergency repair
- Gas and diesel engine
- Marine navigation
- Net and gear design and modification
- Net maintenance and repair
- Oil tanker endorsement levels I and II
- Simulated electronic navigation I and II
- Watchkeeping rating

Specialized Marine Programs

Hydrographic Survey Technologist — Diploma
 Marine and Small Powered Equipment Mechanic — Certificate
 Small Craft and Marina Technology — Certificate

Hydrographic Survey Technologist — Diploma

Duration 6 semesters

Courses

- Adjustment of observations
- Automated survey applications
- Cartography
- Computer applications
- Electronic positioning systems
- Geodesy
- Hydrographic survey
- Marine law
- Navigation, charts and pilotage
- Oceanography and meteorology
- Survey camp
- Tides and currents

Marine and Small Powered Equipment Mechanic — Certificate

Duration 40 weeks

Content

- Trade practicum
- Trade technology
- Welding

Small Craft and Marina Technology — Certificate

Duration 4 semesters

Content

- Boatbuilding and repair
- Electrical circuits and applications
- Gas and diesel motors
- Marina and yacht club design, construction and operation
- Marina contracts, insurance and taxation
- Mathematics
- Navigation
- Outboard engines and marine drive trains
- Sailing school charter fleet operations and yacht brokerage
- Sails and rigging
- Seamanship: power and sail
- Small craft electronics
- Standard operating procedures and office routine
- Yacht design
- Yacht maintenance and repair

Institut de Marine du CEGEP de Rimouski
53 St-Germain Ouest,
Rimouski, Québec, G5L 4B4
Téléphone (418) 724-2822

Institut de Marine du CEGEP de Rimouski
905 rue des Prairies,
Québec, Québec, G1K 3M5
Téléphone (618) 692-1185

Institut de Marine du CEGEP de Rimouski
1111 rue Lapierre,
Ville LaSalle, Québec, H8N 2J4
Téléphone (514) 367-4710

Institut de Marine du CEGEP de Rimouski
Route des Îles, C.P. 2156,
Saint-Romuald, Québec, G6W 5M5
Téléphone (418) 835-1621

INSTITUT DE MARINE DU CEGEP DE RIMOUSKI

Programmes spécialisés dans le domaine maritime

Aide de pointage radar automatique — Certificat
Assistance mécanique — Certificat
Brevet de capitaine au long cours (MM) — Certificat
Brevet de lieutenant de quart (WKM) — Certificat
Brevet de navigateur océanique I (ON I) — Certificat
Brevet de navigateur océanique (ON II) — Certificat
Cuisine de navire — Certificat
Fonctions d'urgence en mer I — Certificat
Fonctions d'urgence en mer II — Certificat
Fonctions d'urgence en mer III — Certificat
Matelotage — Certificat
Mécanique de marine 4^e classe moteur, vapeur et combinée —
Certificat
Mécanique de marine 3^e classe moteur, vapeur et combinée —
Certificat
Mécanique de marine 2^e classe moteur, vapeur et combinée —
Certificat
Mécanique de marine 1^e classe moteur, vapeur et combinée —
Certificat
Mécanique de marine — D.E.C.
Navigation — D.E.C.
Navigation électronique simulée I — Certificat
Navigation électronique simulée II — Certificat
Techniques d'architecture navale — D.E.C.
Transport et manutention de produits pétroliers — Certificat

Aide de pointage radar automatique (APRA) — Certificat

Durée 30 heures

Contenu

- Acquisition manuelle et automatique des cibles et limites de chaque méthode
- Application du règlement international pour prévenir les abordages en mer
- Conditions et méthodes d'obtention des renseignements sur l'indicateur des APRA
- Conditions et méthodes d'utilisation des alarmes de fonctionnement, leurs avantages et leurs limites
- Conditions et méthodes d'utilisation des secteurs de mouvement vrai et relatif
- Danger à se fier de manière excessive aux APRA
- Délais de traitement des données
- Essais de fonctionnement du système
- Facteurs influençant sur le fonctionnement du système
- Normes de fonctionnement de l'O.M.I. concernant les APRA
- Possibilités et limites d'utilisation des APRA en matière de poursuite des cibles
- Principaux types de système d'APRA et leurs caractéristiques en matière de visualisation.
- Réglage et entretien de l'image.

Assistance Mécanique — Certificat

Durée 12 semaines

Contenu

- Construction et stabilité
- Electricité et magnétisme
- Machines et turbines à vapeur
- Moteurs diesel
- Principes d'aménagement de la salle des machines
- Principes de physique
- Réfrigération
- Sécurité
- Servo-moteur et auxiliaires de coque
- Systèmes de pompage

Brevet de capitaine au long cours (MM) — Certificat

Durée 12 semaines

Contenu

- Architecture navale
- Connaissances techniques
- Electricité
- Fonctions d'urgence en mer III
- Gestion de navires
- Instruments de navigation
- Notions de matelotage

Brevet de lieutenant de quart (WKM) (restreint) — Certificat

Durée 12 semaines

Contenu

- Cartographie
- Connaissance générales
- Fonctions d'urgence en mer II
- Instruments de navigation
- Navigation électronique simulée I
- Notions de matelotage
- Règles de route

Brevet de navigateur océanique I (ON I) — Certificat

Durée 12 semaines

Contenu

- Cargaison
- Cartographie
- Construction de navires
- Fonctions d'urgence en mer III
- Gestion de navires
- Météorologie
- Navigation astronomique
- Navigation électronique simulée II
- Notions de matelotage
- Sécurité

Brevet de navigateur océanique (ON II) — Certificat

Durée 12 semaines

Contenu

- Communications
- Connaissances techniques
- Construction
- Fonctions d'urgence en mer III
- Gestion de navires
- Navigation astronomique
- Notions de matelotage
- Stabilité

Cuisine de navire — Certificat

Note: Objectif du programme est de donner une introduction aux méthodes et aux techniques de la cuisine ainsi qu'aux principes de gestion et d'organisation d'une cuisine à bord des navires.

Durée 15 semaines pour les débutants, 13 semaines pour un perfectionnement

Contenu

- Anti-pollution en mer
- Approvisionnement en mer
- Propreté et rangement sur le navire
- Réfrigération et congélation
- Règlement maritimes
- Stage en mer
- Stockage en mer

Fonctions d'urgence en mer I — Certificat

Durée 30 heures

Contenu

- Engins de sauvetage
- Premiers soins
- Prévention et lutte contre les incendies

Fonctions d'urgence en mer II — Certificat

Durée 90 heures

Contenu

- Engins de sauvetage
- Premiers soins
- Prévention et lutte contre les incendies
- Survie et sauvetage en mer

Fonctions d'urgence en mer III — Certificat

Durée 36 heures

Contenu

- Exercices pratiques et simulés
- Hypothermie
- Inspection des équipements et des systèmes de sauvetage
- Organisation des plans d'urgence
- Réanimation cardio-respiratoire (R.C.R.)

Matelotage — Certificat

Durée 12 semaines

Contenu

- Accostage et appareillage
- Aménagement des cales
- Ancrage
- Chargement et déchargement de cargaison
- Conduite des marins
- Cordages et toiles
- Couvernails
- Entretien du navire
- Equipements de ponts
- Loch et ligne de plongée
- Passerelle (practique)
- Peinture
- Sécurité

Mécanique de marine 4^e classe moteur, vapeur, et combinée — Certificat

Mécanique de marine 3^e classe moteur, vapeur, et combinée — Certificat

Mécanique de marine 2^e classe moteur, vapeur, et combinée — Certificat

Mécanique de marine 1^e classe moteur, vapeur, et combinée — Certificat

Note: Les objectifs du programme de mécanique de marine sont de:

- 1) permettre au candidat d'acquérir les connaissances théoriques et pratiques nécessaires à l'exercice de la profession d'officier-mécanicien.
- 2) préparer le candidat aux examens de certification de Transport Canada.

Durée 12 semaines

Contenu

Non disponible

Mécanique de marine — D.E.C.

Durée 3 ans

Cours

- Dessin spécialisé
- Electricité
- Electrotechnique
- Machines marines
- Propulsion
- Réfrigération et air climatisation
- Science des matériaux
- Stabilité

Navigation — D.E.C.

Durée 3 ans

Cours

- Aides à la navigation
- Astronomie nautique
- Cargaison
- Connaissances maritimes
- Machines marines
- Météorologie
- Navigation astronomique
- Navigation côtière
- Navigation électronique simulée
- Règles de route
- Stabilité
- Technologie maritime

Navigation électronique simulée I — Certificat

Durée 180 heures

Contenu

- Exercices de simulation
- Pointage radar
- Pratique des aides électroniques
- Théorie des aides électroniques
- Théorie du radar

Navigation électronique simulée II — Certificat

Durée 60 heures

Contenu

- Exercices simulées
- Journal radar
- Organisations de la passerelle
- Planification de voyages
- Possibilités et limites du radar
- Prévention des abordages
- Principes du pilotage sans visibilité
- Soins et entretien des appareils
- Techniques des lignes parallèles
- Techniques du point radar

Techniques d'architecture navale — D.E.C.

Durée 3 ans

Cours

- Bilan thermique
- Bureaux techniques et organismes maritimes
- Calcul de construction navale
- Construction navale (machines et coque)
- Dessin spécialisé
- Éléments de thermodynamique
- Notions de mécanique des fluides
- Résistance des matériaux
- Théorie du navire

Transport et manutention des produits pétroliers — Certificat

Durée 30 heures

Contenu

- Equipements et mesures de sécurité
- Evolution, design et construction d'un pétrolier
- Lavage des citernes
- Lavage par le brut
- Lutte contre les incendies
- Opération au terminal pétrolier
- Opération de chargement et de déchargement
- Pollution
- Propriétés physiques et chimiques des produits pétroliers
- Règlements régissant le transport et la manutention de produits pétroliers
- Système de gaz inerte
- Système de manutention de la cargaison et du ballast des navires citernes

**KWANTLEN
COLLEGE**

Kwantlen College
5840 Cedarbridge Way,
Richmond, British Columbia, V6X 2A7
Telephone (604) 273-5461

Kwantlen College
9260-140th Street,
Surrey, British Columbia, V3V 5Z4
Telephone (604) 588-4411

Note: Several fisheries and marine training courses, most of which are short-term courses held in the evening, are offered by the Continuing Education Department.

Specialized Marine Programs
(short term courses)

Department, Institutes
Continuing Education

Department of Continuing Education

Degrees none

Courses (Richmond Campus)

- Boat Design for the Small Craft Operator
- Celestial Navigation
- Celestial Navigation Practicum
- Coastal Navigation I
- Coastal Navigation II
- Marine Meteorology
- One Off Fibre Glass Boat Building Techniques
- Small Boat Maintenance and Repair

Courses (Surrey Campus)

- Basic Cook's Training
- Coastal Navigation I
- Coastal Navigation II
- Fishing Fleet Maintenance Diver
- Gillnet Training
- Industrial First Aid
- Marine Communications
- Purse Seine Know How
- Refrigeration Basics for Fishing Vessels
- Scuba Diving Certification for Fishermen
- Trawler Deckhand Training
- Trouble Shooting Hydraulic Systems

Programmes spécialisés dans le domaine maritime

Écologie marine (Biologie) — B.Sc/M.Sc/Ph.D

Départements, Instituts

Biologie
Géographie
Géologie
Groupe interuniversitaire de recherches
océanographiques du Québec
Huntsman Marine Laboratories

Département de **Biologie**

L. Huot, *Directeur (Programme B.Sc)* (418) 656-2352

J.J. Dodson, *Directeur (Programme M.Sc, Ph.D)* (418) 656-5917

Niveaux B.Sc/M.Sc/Ph.D

Cours

- Aménagement de la faune aquatique
- Écologie et pollution
- Écologie marine
- Invertébrés
- Océanographie biologique
- Océanographie physique
- Phycologie
- Vertébrés
- Zoologie
- Aquiculture
- Écologie comportementale des poissons
- Écologie des poissons
- Écologie du benthos marin
- Écologie marine
- Écophysiologie
- Problèmes de phycologie marine

Domaines de recherche

- Bah, A. • Processus physiques en milieux côtiers et estuariens; océanographie physique, hydrodynamique, modélisation (couplage, processus physiques et biologiques; croissance et distribution du phytoplancton qui y son associés.), traitement et analyse de données marines.
- Bédard, J. • Ornithologie, écologie des oiseaux aquatiques. Biologie de la reproduction chez les alcidés.
- Bourget, E. • Communautés littorales, benthiques: structure, organisation, successions, productivité; rôle des facteurs physiques (effet des glaces) et biotiques dans l'établissement de ces communautés.
- Cardinal, A. • Algues marines benthiques macroscopiques et microscopiques (diatomées); systématique, écologie, écophysiologie. Communautés littorales benthiques.
- Dobson, J. • Stratégies de migration et de reproduction chez les poissons; bioénergétique des migrations anadromes par rapport aux patrons de croissance et de reproduction, mécanismes d'orientation migratoire, transport et survie des larves de poissons.
- Duval, A. • Physiologie des gastéropodes pulmonés. Le problème des limaces dans la protection des végétaux. Reproduction et croissance des escargots terrestres. Parasitisme chez les escargots aquatiques.
- Fitzgerald, G. • Ethologie et écologie des poissons; écologie comportementale et éco-physiologie des épinoches (Gasterosteidae), prédation, compétition, stratégie de reproduction.
- Himmelman, J. • Organisation des communautés infralittorales benthiques; rôle des facteurs physiques, broutage et prédation, structure des populations d'échinodermes et de mollusques; contrôle de la reproduction chez les invertébrés marine; aquiculture.

- Lacroix, G. • Écologie du zooplancton marine; transport actif et transport passif, relations avec le phytoplancton et le benthos, biologie des populations.
- Legendre, L. • Phytoplancton des milieux côtiers et estuariens; océanographie biologique, physio-écologie (photosynthèse), océanographie nordique (glaces), broutage par le zooplancton. Ecologie numérique; traitement des données écologiques.
- Moreau, G. • Biologie des poissons; stratégies de reproduction, relations habitat-peuplement, sensibilité aux précipitations acides. Benthos; utilisation de la matière organique allochtone, sensibilité aux précipitations acides.
- Trudel, P. • Biologie des crustacés décapodes.

Département de **Géographie**

B. Robitaille (418) 656-2512

Niveaux B.A.

Cours

- Géomorphologie littorale et marine

Domaines de recherche:

Aucun

Département de **Géologie**

P. Grélinas (418) 656-2193

Niveaux B.A./B.Sc

Cours

- Tectonique

Domaines de recherche

Aucun

Groupe interuniversitaire de recherches océanographiques du Québec (GIROQ)

Le Groupe est relié au Département de sciences biologiques de l'Université de Montréal, du Département de biologie de l'Université Laval (secretariat du GIROQ), au Département de biologie et à l'Institut d'océanographie de l'Université McGill.

Les domaines de recherche sont l'océanographie biologique, l'océanographie géologique, l'océanographie physique et pêches maritimes.

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Specialized Marine Programs:

Aquaculture Extension Courses
Marine Biology
Salmonid Enhancement Training Programme

Departments, Institutes

Not Available

Aquaculture Extension

Duration varies

Courses

- Fish Disease, Advanced (5 days)
- Fish Disease, Basic (3 days)
- Hatchery Techniques for Salmonids (5 days)
- Introduction to Mollusc Culture (3 weeks)
- Introduction to Salmon and Trout Culture (3 weeks)
- Principals of Hatchery Design (5 days)

Marine Biology

Note: Students may complete the first 2 years of their Bachelor of Science degree at Malaspina College. Students must then transfer to another university to complete their Bachelor of Science degree.

Duration 2 years

Courses

- Climatology and biogeography
- Comparative vertebrate morphology
- Geomorphology
- Invertebrate zoology
- Oceanography survey
- The lives of non-vascular plants

Salmonid Enhancement Training Programme

Note: This programme offers a series of Short (3-5 days) courses for salmonid hatchery or project workers.

Duration 3-5 days

Courses

- Computer applications
- Facility design
- Fish disease
- Fry trapping
- Introduction to salmonid enhancement
- Salmonid culture techniques
- Salmonid ecology
- Water quality for fish hatcheries

Marine Institute

Newfoundland and Labrador Institute of Fisheries
 Box 4920,
 St. John's, Newfoundland, A1C 5R3
 Telephone (709) 778-0200
 Registrar (709) 778-0470

Specialized Marine Programs

Able Seaman (Nautical Science Technology) — Certificate
 Automatic Radar Plotting (ARPA) (Nautical Science Technology) — Certificate
 Bridgewardman — (Nautical Science Technology) — Certificate
 Chief Engineer of a Motor Driven Fishing Vessel
 (Mechanical Engineering Technology) — Certificate
 Electrical Technology (Electrical Engineering Technology) — Diploma
 Electronic Technology (Electrical Engineering Technology) — Diploma
 Endorsement in Compass Deviation (Nautical Science Technology) — Certificate
 First Mate Ferry Steamship (Nautical Science Technology) — Certificate
 First Mate Home Trade (ON II) (Nautical Science Technology) — Certificate
 First Mate Inland Waters (CN II) (Nautical Science Technology) — Certificate
 Fishing Master, (all levels) (Nautical Science Technology) — Certificate
 Food Technology (Marine Products) (Food Technology) — Diploma
 Heat Processing and Container Closure Evaluation
 (Food Technology) — Certificate
 Industrial Instrumentation (Electrical Engineering Technology) — Apprenticeship, Certificate
 Marine Cooking and Stewarding (Food Technology) — Certificate
 Marine Diesel Mechanics (Mechanical Engineering Technology) — Certificate
 Marine Electrical Practice (Electrical Engineering Technology) — Pre-Apprenticeship
 Marine Electrical Technician (Electrical Engineering Technology) — Certificate
 Marine Electronics (Electrical Engineering Technology) — Certificate
 Marine Emergency Duties (all levels) (Nautical Science Technology) — Certificate
 Marine Engineer (all levels) (Mechanical Engineering Technology) — Certificate
 Marine Engineering Technology (Mechanical Engineering Technology) — Diploma
 Marine Steelwork (Naval Architecture and Shipbuilding Technology) — Certificate
 Marine Systems Design (Naval Architecture and Shipbuilding Technology) — Diploma
 Master Ferry Steamship (Nautical Science Technology) — Certificate
 Master Home Trade (ON I) (Nautical Science Technology) — Certificate
 Master Inland Waters (CN I) (Nautical Science Technology) — Certificate
 Master Minor Waters Steamship (Nautical Science Technology) — Certificate
 Master Under 350 Tons and Tugmaster Home Trade
 (Nautical Science Technology) — Certificate
 Master Mariner (Nautical Science Technology) — Certificate

Master Small Craft / Master of Small Passenger Ship
 (Nautical Science Technology: Technical) — Certificate
 Mate and Master (Limited) (Nautical Science Technology) — Certificate
 Nautical Science Technology: Fishing Technology Option
 (Nautical Science Technology: Technical) — Diploma
 Nautical Science Technology: Merchant Marine Option
 (Nautical Science Technology) — Diploma
 Naval Architecture (Naval Architecture and Shipbuilding Technology) — Diploma
 Power Engineering Technology (Mechanical Engineering Technology) — Diploma
 Radio Communications (Electrical Engineering Technology) — Certificate
 Refrigeration and Air Conditioning Mechanics
 (Mechanical Engineering Technology) — Apprenticeship
 Refrigeration Plant Operation (Mechanical Engineering Technology) — Certificate
 Restricted Radio Telephone Operator (Maritime) (Nautical Science Technology) — Certificate
 Seafood Processing (Food Technology) — Certificate
 Simulated Electronic Navigation (all levels) (Nautical Science Technology) — Certificate
 Small Craft Design and Construction (Naval Architecture and Shipbuilding Technology) — Certificate
 Watchkeeping Engineer of a Motor Driven Fishing Vessel
 (Mechanical Engineering Technology) — Certificate
 Watchkeeping Mate (all levels) (Nautical Science Technology) — Certificate

Departments, Institutes

Electrical Engineering Technology
 Extension, Continuing Education
 and Student Affairs
 Food Technology
 Mechanical Engineering Technology
 Nautical Science Technology: Certificate Division
 Nautical Science Technology: Offshore Safety Division
 Nautical Science Technology: Technical
 and Vocational Division
 Naval Architecture and Shipbuilding Technology

Department of **Electrical Engineering Technology**

D. Squires, *Head*

Electrical Technology — Diploma

Duration 3 years

Courses

- A.C. circuit theory and measurements
- Applied mathematics
- Applied mechanics
- Automatic control systems
- Communication skills
- Communication systems

- Communication systems design lab
- Computer programming (BASIC)
- Computer science
- Control and power electronics
- Digital techniques
- Electrical fundamentals
- Electrical installations
- Electrical machines
- Electrical practice
- Electronic circuit analysis
- Electronic circuit design
- Electronic circuits
- Electronic communications
- Electronic devices
- Electronic instrumentation
- Electronic instrument lab
- Engineering drawing
- Engineering economy
- Engineering management
- Industrial control electronics
- Industrial process control
- Instrumentation for process control
- Mathematics
- Microcomputer interfacing and applications
- Microcomputer programming
- Microcomputer systems and projects
- Motor control systems
- Navigation systems
- Physics
- Power transmission and distribution
- Protective relaying
- Radar and sonar systems
- Special projects
- Technical report
- Workshop practice

Industrial Instrumentation — Certificate

Duration 9 months

Courses

- Analysis instrumentation
- Applied electronics
- Applied mechanics
- Digital fundamentals
- Instrumentation lab
- Instrumentation theory
- Mathematics
- Microprocessors
- Process control
- Special projects

Marine Electrical Practice — Pre-Apprenticeship

Duration 9 months

Courses

- Blueprint reading
- Communication skills
- Craft theory
- Electrical theory

- Electrical workshop
- Introduction to electronics
- Mathematics
- Shipbuilding

Marine Electronics — Certificate

Duration 9 months

Courses

- Applied electronics
- Digital fundamentals
- Electronic theory
- Mathematics
- Microprocessors
- Special projects
- Test equipment

Radio Communications — Certificate

Duration 9 months

Courses

- Communication skills
- Digital electronics
- Electronic principles
- Maintenance and practice
- Marine operations
- Microcomputers
- Radio regulations and procedures
- Typing

**Department of Extension, Continuing Education
and Student Affairs**R. T. LeMessurier, *Head*

Duration Varies

Courses

- Advanced Cod Trap Construction (6 weeks)
- Advanced Seafood Preparation (30 hours)
- Arc Welding and Gas Cutting for Fishermen (4 weeks)
- Basic Refrigeration (40 hours)
- Business Practices for Fishermen (2 weeks)
- Coastal Navigation and Pilotage (40 hours)
- Computer Programming (basic) (30 hours)
- Digital Electronics (51 hours)
- Fibreglass Boat Repair (4 weeks)
- Fish Filleting (2 weeks)
- Fish or Shellfish Plant Start-up Training (2-3 weeks)
- Fish Splitting and Salting (2-3 weeks)
- Fishing Vessel Outfitting (8-12 weeks)
- Groundfish Trawling (4 weeks)
- Home Pickling and Curing (8 hours)
- Home Preservation of Food (30 hours)
- Home Smoking of Foods (12 hours)
- Inshore Fishing Gear Operation (4 weeks)
- Introduction of Basic Inshore Fishing Gear (21 hours)
- Introduction to Oceanography (54 hours)
- Introduction to Seafood Preparation (30 hours)
- Marine Emergency Duties (5 days)
- Marine/Industrial Control Electronics (84 hours)

- Microprocessors (51 hours)
- Navigation (Basic) for Fishermen (4 weeks)
- Nets and Gear Repair and Maintenance (4 weeks)
- Ocean and Celestial Navigation (40 hours)
- Point-of-sale Grading (Groundfish) (4 weeks)
- Point-of-sale Grading of Cod for Salting (3 weeks)
- Quality Control for Food Processors (36 hours)
- Radar and Electronic Navigational Aids (40 hours)
- Record Keeping and Taxation for Fishermen (3 weeks)
- Salt Fish and Stock Fish Production (2 weeks)
- Sanitation Management (36 hours)
- Scuba Diving for Fishermen (2 weeks)
- Seafood Preparation (30 hours)
- Small Diesel Engine Repair and Maintenance (40 hours)
- Small Engine Repair and Maintenance (Gasoline) (40 hours)
- Supervisory Skills for Fish Plant Personnel (2 weeks)
- Marine Engine Repair and Maintenance (4 weeks)
- Trawler Deckhand (Pre-sea) (6 weeks)
- Trawler Officers Management (20 days)
- Wood Boat Repair (4 weeks)
- Wood Shipbuilding for Fishermen (8-12 weeks)

Department of **Food Technology**

R.S. Whitaker, *Head*

Duration Varies

Courses

- Breaded Products Production (2 weeks)
- Crab Handling and Processing (3 weeks)
- Finished Product Grading and Packaging (3 weeks)
- Groundfish Handling and Processing (3 weeks)
- Hand Splitting and Salting of Fish (3 weeks)
- Industrial Canning and Bottling (3 weeks)
- Industrial Sanitation (3 weeks)
- Introduction to Quality Control (4 weeks)
- Marine Stewarding (16 weeks)
- Mollusc Handling and Processing (3 weeks)
- Pelagic Fish Handling and Processing (4 weeks)
- Point-of-sale Grading (Cod for Salting) (3 weeks)
- Point-of-sale Grading (Groundfish) (4 weeks)
- Production Supervision and Enhancement (7 weeks)
- Quality Assessment and Industrial Sanitation (6 weeks)
- Roe Handling and Processing (1 week)
- Salt Fish and Stock Fish Production (3 weeks)
- Skill Training for Crab Plant Workers (3 weeks)
- Skill Training for Filleting Plant Workers (3 weeks)
- Smoking Techniques (2 weeks)
- Squid Handling and Processing (3 weeks)
- Supervisory Skills (2 weeks)
- Surimi Production (3 weeks)

Food Technology (Marine Products) — Diploma

Duration 2 years

Courses

- Biology
- Chemistry
- Communication skills

- Computer programming (BASIC)
- Economics
- Electrotechnology
- Food chemistry
- Food engineering
- Food ingredient technology
- Industrial plant sanitation
- Instrumentation management
- Mathematics
- Microbiology
- Processing biology
- Processing technology
- Seminar
- Statistical quality control
- Statistics

Fundamentals of Seafood Processing — Certificate

Duration 35 hours

Content

- Incentive systems
- Industrial relations
- Industrial seminars/first aid
- Processing technology

Heat Processing and Container Closure

Evaluation — Certificate

Duration 1 week

Content

Not available

Practical Seafood Processing — Certificate

Duration 32 hours

Contents

- Communication skills
- Fish handling
- Foremanship
- Mathematics
- Quality control
- Sanitation and hygiene

Department of **Mechanical Engineering Technology**

R.F. Angel, *Head*

Chief Engineer of a Motor Driven Fishing Vessel — Certificate

Duration not available

Content

Not available

Marine Diesel Mechanics — Certificate

Duration Not available

Content

- Communication skills
- Electrotechnology
- Engineering drawing
- Engineering knowledge

- Engineering practice and theory
- Machine shop practice
- Mathematics

Marine Engineer 4th Class — Certificate

Marine Engineer 3rd Class — Certificate

Marine Engineer 2nd Class — Certificate

Marine Engineer 1st Class — Certificate

Note: Prepares candidates for the Transport Canada Examinations.

Duration Not available

Content

Not available

Marine Engineering Technology — Diploma

Power Engineering Technology — Diploma

Duration 3 years

Courses

- Applied thermodynamics
- Communication skills
- Electrotechnology
- Engineering drawing
- Engineering practice
- Engineering technology
- Fluid mechanics
- Machine shop
- Materials and processes
- Mathematics
- Mechanics of machines
- Naval architecture
- Physics
- Strength of materials

Refrigeration and Air Conditioning Mechanics — Apprenticeship

Note: Apprenticeship training is only offered in conjunction with the Provincial Department of Career Development and Advanced Studies. Interested persons should contact the local Training Office or the Provincial Manpower Training Division of the Department, Confederation Building, St. John's, Newfoundland, A1C 5T7 for information.

Duration Not available

Content

Not available

Refrigeration Plant Operation — Certificate

Duration Not available

Content

- Communication skills
- Electrotechnology
- Engineering drawing
- Machine shop practice
- Mathematics
- Refrigeration theory

Watchkeeping Engineer of a Motor Driven

Fishing Vessel — Certificate

Note: Prepares candidate for the Transport Canada Examination.

Duration Not available

Content

Not available

Department of **Nautical Science Technology:**
Technical and Vocational Division

D. Drown, *Head*

Duration Varies

Courses

- Advanced Cod Trap Construction (6 weeks)

Content

To instruct practicing inshore fishermen in the methods on constructing Newfoundland type cod traps and modifying existing cod traps.

- Basic Navigation (6 weeks)

Content

- Chartwork
- Communications
- First aid and radio telephone
- Fishing gear and fish detection equipment
- Introduction to use of electronic navigational aids

- Business Practices for Fishermen (2 weeks)

Content

- Bounties and subsidies
- Income tax
- Insurance
- Loans
- Records
- Types of business organizations
- Workmen's compensation

- Danish Seining (4 weeks)

Content

- Construction
- Design
- Maintenance and repair of Danish seines and ancillary equipment
- Rigging

- Deckhand (Pre-sea) Merchant Marine (12 weeks)

Content

- MED II (including first aid)
- Practical seamanship (training vessel)
- Theoretical seamanship

- Fish Finding with Sonar (1 week)

Content

- Control settings
- Description and types of echosounding and sonar equipment
- How sonar works
- Understanding the display using the sonar to set the seine

- Fishing Gear and Methods (10 weeks)

Content

- First aid
- Fish detection

- Gear construction
 - Nautical knowledge
 - Groundfish Trawl Construction and Repair (4 weeks)

Content

 - Ancillary equipment including doors, gallows, hoisting devices
 - Assembly
 - Operation and repair of groundfish trawls
 - Rigging
 - Inshore Fishing Gear (6 weeks)

Content

 - Basic netmending, including knowledge of hanging ratios
 - Characteristics of fishing gear materials
 - Gear-handling equipment suitable for use on small fishing vessels
 - Operation and repair of: cod-traps and herring traps; gill-nets, salmon-nets and herring-nets; lobster pots
 - Longliner Operations (4 weeks)

Content

 - Diversification: conversion of longliners to trawling for shrimp and groundfish; danish-seining; modern gear-handling equipment, including automatic reels; purse-seining; scallop-dragging; winter lay-up of fishing vessels
 - Introduction to basic chartwork, navigational aids, and fish detection equipment
 - Introduction to operation, assembly and repair of groundfish and shrimp trawls
 - Methods of handling, storing and discharging of fish
 - One week safety course
 - Seamanship: collision prevention regulations and other legislation affecting fishing vessels, stability, communications
 - Vessel construction-hull preservation, installation of electrical equipment, piping arrangements.
 - Longliner (Pre-sea) (6 weeks)

Content

 - Fish handling
 - Maintenance of engine, deck machinery and ancillary equipment
 - Maintenance of hull
 - Operation, assembly, maintenance and repair of: automatic reels; crab pots; gill nets; long lines
 - Preparation of simple meals
 - Midwater Trawl Assembly (3 weeks)

Content

Construction of midwater trawl including; cutting out and joining sections; setting up to support ropes attaching floats and groundrope; building cod end with expansion ropes.
 - Navigational Aids for Fishermen (2 weeks)

Content

Principles, operation and maintenance of major navigational aids found on coastal fishing vessels.
 - Netmakers (Manual) (12 weeks)

Content

 - Net braiding, cutting and rigging; net specifications
 - Safety, fire fighting and first aid
 - Record-keeping and Taxation for Fishermen (3 weeks)

Content

 - Bookkeeping terminology
 - Business arithmetic
 - Introduction to income tax requirements
 - Inventory of capital cost and fishing equipment items
 - Record of income and expenses
 - Shrimp Trawling (4 weeks)

Content

 - Design, construction, operation and repair of shrimp trawls and ancillary equipment
 - Trawler Deckhand (Pre-sea) (6 weeks)

Content

 - Basic seamanship
 - First aid
 - Fishhandling
 - Knots and splices
 - Net repair and assembly
- Nautical Science Technology:*
Fishing Technology Option — Diploma
 Duration 3 years including sea-time
- Nautical Science Technology:*
Merchant Marine Option — Diploma
 Duration 4 years including work practice
- Courses**
- Cargo operations
 - Chemistry
 - Communications (signals)
 - Communication skills
 - Computer programming (BASIC)
 - Electrotechnology
 - Engineering knowledge
 - Fish detection
 - Fisheries and marine law
 - Fishing gear technology
 - Fishing techniques
 - Handling/processing of fish
 - Hydrography
 - Industrial hydraulics
 - Marine law
 - Mathematics
 - Meteorology/oceanography
 - Nautical astronomy
 - Naval architecture
 - Navigation
 - Navigational aids
 - Physics
 - Seamanship
 - Shipbuilding
 - Technical report

Department of **Nautical Science Technology:**
Certification Division

Able Seaman — Certificate

Duration 6 weeks

Contents

- Cargo hold knowledge
- Deck machinery
- Magnetic and gyro compasses
- Marine emergency duties II
- Safe working practices
- Ship knowledge

Automatic Radar Plotting Aids (ARPA) — Certificate

Duration 5 days

Contents

Training and familiarization is provided on four different kinds of ARPA.

Bridgewardman — Certificate

Duration 6 weeks

Content

- Magnetic and gyro compasses
- Marine emergency duties II
- Nautical terminology
- Navigation lights and signals
- Rope use and handling
- Safe working practices
- Wire rope, chain and shackles

Endorsement in Compass Deviation — Certificate

Duration Not available

Content

- Compass work and ship's magnetism
- Electricity
- Magnetism
- Oral and practice

First Mate Ferry Steamship — Certificate

Duration Not available

Content

- Chartwork and pilotage
- General seamanship
- General ship knowledge
- Navigation safety
- Navigational instruments
- Ship management
- Simulated electronic navigation (SEN.I)

Fishing Master Class IV — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- General seamanship
- Navigating instruments
- Navigation safety

Fishing Master Class III — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Navigating instruments
- Navigation safety

Fishing Master Class II — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Mathematics
- Meteorology
- Navigating instruments
- Navigation safety
- Ship management
- Simulated electronic navigation (SEN I)

Fishing Master Class I — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigation
- Navigation safety
- Simulate electronic navigation (SEN II)

Master Ferry Steamship — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- Communications
- General seamanship
- Navigation safety
- Ship management
- Simulated electronic navigation (SEN II)
- Stability

Master Minor Waters Steamship — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- Oral and practical
- Shipmaster's business and shipboard knowledge

Master Under 350 Tons and Tugmaster**Home Trade** — Certificate

Duration Not available

Contents

- Chartwork and pilotage
- General seamanship
- Meteorology
- Ship management
- Simulated electronic navigation (SEN II)

Master Mariner — Certificate

Duration Not available

Contents

- Electricity
- Engineering knowledge
- General seamanship
- Naval architecture
- Navigation instruments
- Ship management

Master of a Small Craft and Master of**a Small Passenger Ship** — Certificate

Duration Not available

Contents

The examination is based on as much of the syllabus for the Master Minor Waters, as deemed appropriate to the area of operation and the type of craft for which the certificate is to be valid.

Mate and Master Limited — Certificate

Duration Not available

Contents

Not available

ON I Master Home Trade — Certificate

Duration Not available

Contents

- Cargo
- Chartwork and pilotage
- General seamanship
- Mathematics
- Meteorology
- Navigation
- Navigation safety
- Ship construction and engineering
- Ship management
- Simulated electronic navigation (SEN II)

CN I Master Inland Waters — Certificate

Duration Not available

Contents

- Cargo
- Chartwork and pilotage
- Engineering knowledge
- General seamanship
- Meteorology

- Navigation safety
- Ship management
- Simulated electronic navigation (SEN II)

ON II First Mate Home Trade — Certificate

Duration Not available

Contents

- Astro-navigation
- Communications
- Engineering knowledge
- General seamanship
- Mathematics
- Ship construction and cargo
- Ship management
- Stability

CN II First Mate Inland Water — Certificate

Duration Not available

Content

- Communications
- General seamanship
- Ship construction and cargo
- Ship management
- Stability

Restricted Radio Telephone Operator (Maritime) — Certificate

Duration Not available

Content

- Frequencies and logbooks
- Priorities
- Regulation
- Transmitting techniques

Simulated Electronic Navigation (SEN I)**Parts A and B Electronic Navigation Aids** — Certificate

Duration 4 weeks

Content

- Azimuth mirror, telescopes, binoculars and whistles
- Depth measuring devices
- Gyro compasses
- Magnetic compass
- Navigational aids
- Position fixing
- Radar plotting

Part B Radar Simulator

Duration 6 weeks

Content

- Coastal navigation using modern navigational aids and the results of the action taken.
- Simulated radar exercises involving risk of collision between two vessels

Simulated Electronic Navigation II (SEN II) — Certificate

Duration 10 days

Content

- Coastal navigation
- Parallel index techniques and manoeuvring
- Passage planning
- Simulated radar exercises
- Use of radar

Watchkeeping Mate — Certificate

Duration Not available

Content

- Chartwork and pilotage
- General seamanship
- Mathematics
- Navigating instruments
- Navigation safety
- Simulated electronic navigation (SEN I)

Department of **Nautical Science Technology:****Offshore Safety Division**

Duration Varies

Courses

- Ballast Control Operations Training: Basic (5 days)
 - Content**
 - Hydrostatics
 - Shearing, bending and variable loadings
 - Stability
- Ballast Control Operations Training: Advanced (5 days)
 - Content**
 - Ballast and deballast procedures
 - Emergency operating procedures
 - Operating and back-up systems
 - Stability at large angles
 - Sub-arctic operations
- Basic Offshore Survival Training (BOST) (10 days)
 - Content**
 - Cardiopulmonary resuscitation (CPR)
 - Emergency safety orientated first aid (SOFA)
 - Hypothermia
 - Offshore hazards, fire prevention and control
 - Rig abandonment, rescue and survival
- Basic Offshore Survival (BOS) (35 hours)
 - Content**
 - Familiarization with offshore hazards
 - Passenger helicopter procedures and emergencies
 - Safety and survival techniques
- Fast Rescue Craft Training (FRC) (4 days)
 - Content**
 - Craft design, components and philosophy
 - Safe craft handling
 - Safety and rescue equipment
- Helicopter Passenger Emergency Procedures (4 hours)
- Helicopter Pilot Emergency Procedures (Varies)
 - Content**
 - Varies

Marine Emergency Duties I — Certificate

Duration 5 days

Content

- Firefighting
- Lifesaving appliances
- Survival and rescue

Marine Emergency Duties II — Certificate

Duration Not available

Content

- Firefighting
- First aid
- Rescue and survival

Marine Emergency Duties III — Certificate

Duration Not available

Content

- Firefighting
- Lifesaving
- Ship handling and management

Marine Emergency Duties II to BOST Conversion — Certificate

Duration 5 days

Content

- Cardiopulmonary resuscitation (CPR)
- Safety orientated first aid (SOFA)

Oilspill Countermeasures Training Unit (OCTU)

Duration Varies

Courses

- Offshore One (5 days)
 - Content**
 - Types of spill, environmental impact, "hands-on" training with offshore oilspill countermeasures equipment including booms, recovery equipment and dispersants.
- Offshore Two (5 days)
 - Content**
 - Operation, prevention, maintenance and troubleshooting of countermeasure equipment.
- Inshore One (5 days)
 - Content**
 - Types of spill, environmental impact, as well as "hands-on" training with inshore oilspill countermeasures equipment.
- Command One (3 days)
 - Content**
 - Contingency planning and simulated countermeasures exercises.
- Offshore Fire Leaders Training (OFL) (5 days)
 - Content**
 - Responsibilities; assessment of fire condition and correct initial action; fire fighting equipment, operation and maintenance; organization, monitoring and assessment of fire drills.

- Offshore Fire Team Training (OFT) (5 days)
Content
Fire science; fire suppression and containment equipment; personnel protective equipment; rescue equipment; fire assessment; fire fighting techniques; search and rescue; automatic fire detection and protection systems.
- Recurrent Program for Basic Survival Training (2 days)
Content
Use of safety, survival and rescue equipment.
- Rig Rescue Craft Training (3 days)
Content
Rescue craft handling and operation; launch and recovery procedures; safety and rescue equipment; rescue techniques; transfer of casualties; search and rescue operations.
- Short Offshore Survival Training (SOS) (5 days)
Content
 - Emergency procedures
 - Hazards associated with the offshore
 - Helicopter emergency procedures
 - Hypothermia
 - Psychology of survival
 - Search and rescue
 - Use of lifesaving appliances and survival equipment
- Marine engineering practice
- Marine engineering project
- Mathematics
- Measurement and control technology
- Mechanics of machines
- Naval architecture
- Offshore platforms engineering technology
- Powering system technology
- Physics
- Propulsion technology
- Refrigeration and hydraulic system technology
- Resistance and propulsion
- Ship design
- Ship design interface
- Ship design project
- Ship engineering design project
- Ship theory
- Shipboard operations
- Shipbuilding
- Shipbuilding (steel)
- Shipbuilding (wood)
- Shipyard management
- Strength of materials

Department of **Naval Architecture and Shipbuilding Technology**

R. Pearson, *Head*

Marine Steelwork — Certificate

Duration 9 months

Courses

- Communication skills
- First aid
- Mathematics
- Plans and templates
- Science
- Shipbuilding theory
- Steelwork practical
- Steelwork theory

Marine Systems Design — Diploma

Naval Architecture — Diploma

Duration 3 years

Courses

- Applied thermodynamics
- Auxiliary system design
- Auxiliary systems design technology
- Cold environment design technology
- Communications skills
- Computer applications
- Computer programming (BASIC)
- Electrotechnology
- Electrotechnology project
- Feasibility and reliability theory
- Hydrodynamics
- Marine engineering design process

Small Craft Design and Construction — Certificate

Duration 2 years

Courses

- Basic naval architecture
- Boat design project
- Boatbuilding project
- Boatbuilding skills
- Boatbuilding theory (wood)
- Boatbuilding theory (frp)
- Boatbuilding theory (steel/aluminum)
- Boatyard management
- Drafting
- Engineering systems
- Fishing methods

The Registrar's Office
McGill University
845 Sherbrooke St., West,
Montreal, Quebec, H3A 2T5
Telephone (514) 398-4455
Telex 052-68510

McGILL
UNIVERSITY

MCG

Specialized Marine Programs

Marine Biology (Biology) — B.Sc/M.Sc/Ph.D
Marine Parasitology (Institute of Parasitology) — M.Sc/Ph.D
Oceanography (Institute of Oceanography) — M.Sc/Ph.D

Departments, Institutes

Bellairs Research Institute
Biology
Centre for Continuing Education
Civil Engineering
Economics
Geography
Geological Sciences
Groupe interuniversitaire de recherches
océanographiques du Québec
Huntsman Marine Laboratories
Institute of Comparative Law
Institute of Oceanography
Institute of Parasitology
Law
Meteorology
Physics
Redpath Museum

Bellairs Research Institute

St. James, Barbados

Dr. Wayne Hunte, *Director* (809) 422-2087

The Institute emphasizes biological oceanography (see under Institute of Oceanography) and tropical climatology (see under Geography). A field course in tropical marine ecology is held every other year. McGill students and faculty can also carry out research in marine biology, chemical and physical oceanography and other areas.

Courses

- Applied tropical ecology

Department of Biology

Marine Biology Advisors (514) 398-6400/4401

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Biological oceanography
- Biology of algae
- Biology of fishes
- Biology of invertebrates
- Invertebrate zoology (advanced)
- Marine aquaculture
- Marine mammals
- Parasitism and symbiosis
- Biological oceanography
- Marine biology
- Oceanography

Research Areas

Goldstein, M.E. • Phycology, mariculture of seaweed resources.
Hunte, W. • Tropical fish ecology, behavioural ecology, sexual selection.
Kramer, D.L. • Behavioural ecology, feeding, respiration of fishes.
Leggett, W. • Fish population dynamics, evolutionary, and behavioural ecology of fish, dynamics of coastal ecosystems.
Lewis, J.B. • Biology of coral reefs, ecology of coral reef communities, tropical oceanography.
Marsden, J.R. • Neurosecretion.
Reiswig, H.M. • Biology of sponges.

Centre for Continuing Education

Program Administrator (514) 398-6161

Note: This Certificate program in transportation is recognized by the Canadian Institute of Traffic and Transportation. The program consists of 10 courses and is offered on a part-time basis only.

Degrees Certificate

Courses

- Marine transport management

Research Areas

None

Department of Civil Engineering and Applied Mechanics

Advisors (514) 398-6864/6863

Degrees B.Eng/M.Eng/Ph.D

Courses

- Advanced hydraulics
- Fluid mechanics of pollution
- Gravity currents and related phenomena
- Hydrodynamics
- Water waves and allied motions

Research Areas

Savage, S.B. • Sediment transport, wave motions.
Chu, V.H. • Dispersion and diffusion of pollutants in rivers and estuaries, thermal discharges, jets and plumes.

Department of Economics

Department (514) 398-4850

Degrees B.A.(Hons)

Courses

- Natural resource economics

Research Areas

Not available

Department of Geography

Department (514) 398-4111

Degrees B.A.(Hons)/B.Sc(Hons)

Courses

- Geography of northern lands

Research Areas

Bird, J.B. • Coastal geomorphology, beach erosion.
Lewis, J.E. • Marine ice studies.

Department of Geological Sciences*Advisor* (514) 398-6767**Degrees** B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Geology of energy resources
- Historical geology
- Marine geology and geochemistry
- Recent sediments and marine geology

Research Areas

d'Anglejan, B.F. • Sedimentology and geochemistry of northern estuaries and coastal waters.

Hesse, R. • Sedimentology, diagenesis and low-temperature geochemistry, plate tectonics.

Mucci, A. • Chemical oceanography, low-temperature geochemistry.

Groupe interuniversitaire de recherches océanographiques du Québec (GIROQ)

Le Groupe est relié au Département de sciences biologiques de l'Université de Montréal, du Département de biologie de l'Université Laval (secretariat du GIROQ), du Département de biologie et à l'Institut d'océanographie de l'Université McGill.

Les domaines de recherche sont océanographie, biologique, océanographie géologique, océanographie physique et pêches maritimes.

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Institute of Comparative LawProfessor Armand de Mestral, *Director* (514) 398-6646

Note: As a centre of comparative legal studies, the Institute provides facilities for graduate work, advanced studies and research in certain areas of comparative public and private law, in particular comparative private law, international business law, human rights law and medical law.

Degrees M.C.L./LL.M./D.C.L.**Courses**

- Resolution of international disputes
- International maritime conventions

Research Areas

None

Institute of Oceanography

3620 University Street

Montreal, Quebec, H3A 2B2

J.B. Lewis, *Chairman*

Note: The Institute of Oceanography is interdepartmental in scope, emphasizing the interdisciplinary nature of oceanography.

Laboratory and library facilities are available for research and opportunities for field work exist in the Arctic, the estuary of the St. Lawrence River, the Gulf of St. Lawrence, the Canadian eastern seaboard and at the Bellairs Research Institute. Special research interests include the physics of sea ice, energy exchange between atmosphere and hydrosphere, marine climatology and geochemistry of coastal water, growth and life cycles of marine organisms, marine productivity and marine biogeography.

Degrees B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Advanced marine ecology
- Biological oceanography
- Geological oceanography
- Introduction to physical oceanography
- Marine pollution
- Physical oceanography
- Estuaries
- Marine geology and geochemistry
- Reading courses in physical oceanography
- Sediments and marine geology
- Seminar course in physical oceanography
- Seminar in oceanography
- Topics in oceanography

Research Areas

Not available

Institute of ParasitologyDr. Roger Prichard, *Director* (514) 398-8686

Note: The Institute teaches and studies the phenomenon of parasitism in man, farm and domestic animals, wildlife and fish.

Marine-related research includes the parasitology of anadromous and marine fishes, especially migratory salmonids and marine fish of commercial importance (cod and herring). The Institute is affiliated to the McGill Centre for Tropical Diseases at the Montreal General Hospital.

Degrees M.Sc/Ph.D**Courses**

- Immunology (introduction)
- Parasitism and symbiosis
- Parasitology (introduction)
- Diagnostic parasitology
- Parasitology
- Parasitology (advanced)
- Parasitology (seminar)
- Perspectives in parasitology

Research Areas

Curtis, M.A. • Fish parasitology, ecology.

Rav, M.E. • Fish and mammalian parasitology, behaviour and ecology.

Tanner, C.E. • Immunology of fish.

Faculty of Law*Department* (514) 398-6666**Degrees** B.C.L./L.L.B.**Courses**

- International carriage of goods by sea
- Law of the sea
- Public international law

Research Areas

Not available

Department of Meteorology*Advisor* (514) 398-4405**Degrees** B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Atmospheric dynamics
- Atmospheric radiation
- Atmospheric turbulence
- Climatology
- Dynamic meteorology
- Numerical and dynamical meteorology
- Physical meteorology
- Topics in meteorology
- Weather systems and climate
- Atmospheric computer modeling
- Climatology (seminar)
- Dynamic meteorology (seminar)
- Physical meteorology (seminar)

Research Areas

Dunbar, M.J. • Polar marine ecosystems, effects of climatic changes on marine life.

Ingram, R.G. • Estuarine and coastal circulation, sea ice dynamics.

Lin, C.A. • Climate dynamics (energy balance models, ocean circulation); dynamic meteorology.

Mysak, L.A. • Climate dynamics (air/sea interactions; interannual variability); physical and dynamic oceanography.

Department of Physics*Department* (514) 398-6485**Degrees** B.Sc(Hons)**Courses**

- Physics of the oceans

Research Areas

None

Redpath Museum

The museum offers teaching and research facilities in marine biology and keeps extensive plankton collections.

Registrar
 McMaster University
 Hamilton, Ontario, L8S 4L8
 Telephone (416) 525-9140
 Telex 021-8347

Specialized Marine Programs

None

Departments, Institutes

Civil Engineering and Engineering Mechanics
 Geography
 Geology

 Department of **Civil Engineering and Engineering Mechanics**

Degrees M.Eng/Ph.D

Courses

- Coastal engineering
- Environmental fluid mechanics
- Estuarine hydrodynamics
- Mechanics of flow and wave motion

Research Areas

- Donelan, M.A. • Interaction of waves and coastal structure, wave spectra.
 Hamblin, P.F. • Estuary hydro-dynamics, dynamics of water basins.
 Lam, D.C.L. • Numerical models of advection-diffusion, numerical models of aquatic processes.
 Murthy, C.R. • Nearshore advective and diffusive processes in limnology/oceanography.

 Department of **Geography**

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Coastal geomorphology

Research Areas

- McCann, S.B. • Coastal zone of the Atlantic Provinces and the Arctic.

 Department of **Geology**

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Advanced Paleontology
- Geochemistry
- Physical Oceanography
- Sedimentology (Chemical Processes)
- Sedimentology (Physical Processes)
- Facies Models
- Paleocology
- Physical Oceanography

Research Areas:

- Middleton, G.V. • Facies Models
 Risk, M.J. • Paleontology, corals
 Walker, R.G. • Facies models
 Westermann, G.E.G. • Germanium Ammonoidea

Office of the Registrar
Mount Saint Vincent University
166 Bedford Highway,
Halifax, Nova Scotia, B3M 2J6
Telephone (902) 443-4450
Telex 019-21591

MOUNT SAINT VINCENT UNIVERSITY

MSV

Specialized Marine Programs

None

Departments, Institutes

Home Economics
Sociology

Department of Home Economics

Degrees B.Sc.

Courses

- Advanced sensory methods
- Food production formulation
- Food research

Research Areas

LeBlanc, E. • Molecular and ultra-structural changes in fish during frozen storage as a basis for toughening, textural quality of supermarket frozen fish, and comparative sensory quality of frozen fish.

McDowell, M. • Technology in the production of seal and walrus products for manufacturing and marketing by Inuit as a small scale enterprise.

Smith, D. • Vacuum packed cook-chill seafood products.

MOUNT ALLISON UNIVERSITY

Mount Allison University
Sackville, New Brunswick, E0A 3C0
Telephone (506) 364-2200
Telex 014391

Specialized Marine Programs

None

Departments, Institutes

Biology

Huntsman Marine Laboratories

Department of **Biology**

Dr. R.G. Thompson, *Head*

Degrees B.Sc(Hons)/M.Sc

Courses

- Marine biology
- Ichthyology
- Ornithology

Research Areas

None

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Department of **Sociology**

Courses

None

Research Areas

Okihiro, N. • Piscatorial crime in the fishery.

Specialized Marine Programs

Biopsychology (Psychology, Biology) — M.Sc/Ph.D
Marine Biology (Biology) — B.Sc/M.Sc/Ph.D
Maritime History (History) — B.A./M.A./M.Phil/Ph.D
Naval Architecture (Engineering and Applied
Science) — B.Eng
Ocean Engineering (Engineering and Applied
Science) — M.Eng/Ph.D
Physical Oceanography (Physics) — M.Sc/Ph.D
Refresher Course for Rig Medics (Centre for Offshore
and Remote Medicine) — Certificate
Ship Dynamics (Mathematics and Statistics) — B.Sc

Departments, Institutes

Biochemistry
Biology
Centre for Cold Ocean Resources Engineering
Centre for Offshore and Remote Medicine
Chemistry
Earth Sciences
Economics
Engineering and Applied Science
Geography
History
Huntsman Marine Laboratories
Marine Science Research Laboratory
Maritime History Group
Mathematics and Statistics
Newfoundland Institute for Cold Ocean Science
Ocean Engineering Research Group
Physics
Political Science
Psychology
Sociology

Department of Biochemistry

Undergraduate Advisor (709) 737-8530

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Science and technology of marine food products
- Science and technology of sea foods

Research Areas

Davidson, W.S. • Molecular biology, recombinant DNA, proteins.
Harzburg, G.R. • Nutrition, lipids, metabolism, birds.
Robinson, J. • Molecular biology, gene expression in sea urchins.
Voigt, M.N. • Mycotoxins, aflatoxin, deoxynivalenol, nutrition,
vitamins, salmonella, biogenic amines, food.

Department of Biology

Undergraduate Advisor (709) 737-7497

Graduate Officer (709) 737-7498

Note: An interdisciplinary program in Biopsychology is offered jointly by the Departments of Biology and Psychology. See under Department of Psychology for details.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Aquatic biology
- Aquatic microbial ecology
- Biology of invertebrates
- Biology of vertebrates
- Ichthyology
- Marine biology (field course)
- Marine biology (internship in)
- Marine botany
- Marine invertebrates
- Phycology
- Planktology
- Quantitative methods in biology
- Advanced phycology
- Benthic ecology
- Biological oceanography
- Biological oceanography (special topics in)
- Biology of molluscs
- Biology of phytoplankton
- Biology of zooplankton
- Carcinology
- Chemical oceanography (advanced)
- Dynamic meteorology
- Ecological energetics
- Experimental design in biological oceanography
- Fishery biology
- Fluid dynamics
- Geodynamics
- Geophysics (advanced topics in)
- History of oceanography
- Ichthyology
- Marine geology
- Marine geophysics
- Marine modelling
- Organic materials in seawater

- Ornithology
- Parasitic protozoology
- Planktology

Research Areas

- Aldrich, F.A. • Biology of cephalopods and echinoderms.
 Ball, I.R. • Systematics and biogeography of triclads.
 Burton, D. • Neural and hormonal control of teleost chromatophores.
 Cowan, G.I. • Biochemical taxonomy.
 Dabinett, P.E. • Aquaculture of the giant scallop.
 Emerson, I. • Sea star ecology.
 Evans, J.W. • Boring molluscs.
 Gardner, G. • Biological oceanography; plankton ecology.
 Gow, J.A. • Marine heterotrophic bacteria.
 Green, J.M. • Behavioural ecology of marine fish.
 Haedrich, R.L. • Systematics and ecology of fishes; biological oceanography.
 Kao, M. • Marine invertebrates
 Khan, R.A. • Haematozoa of marine fish.
 Knoechel, R. • Plankton population dynamics and energy flow.
 Morris, D.W. • Community structure, habitat selection, demography and social behavior of small animals.
 Nolan, R.A. • Biological control, especially as related to entomophthora and codomomyces.
 Steele, D.H. • Marine and freshwater ecology and biogeography.
 Steele, V.J. • Histology of marine invertebrates.
 Threlfall, W. • Helminthology; ornithology.
 Whittick, A. • Marine phycology.

Centre for Cold Ocean Resources Engineering (C-CORE)

Dr. J.I. Clark, *Director* (709) 737-8534

The primary objective of C-CORE is to undertake engineering research designed to assist in the safe, orderly development and utilization of Canada's ocean-related resources. C-CORE brings together a multi-disciplinary team of researchers whose expertise includes geology, mining, electronics, remote sensing, ice construction and transportation. The Centre's research is presently focussed on ice in the northern oceans, its occurrence and behaviour, and the problems it presents to engineering designers and systems operators.

Specific research areas include:

- 1) Remote sensing; using ground wave radar for ocean and ice hazard detection.
- 2) Ice properties; ice dynamics, the motion of bergy bits and growlers and ice interaction.
- 3) Seabed geotechnics; the geology, geophysics, and geotechnical engineering properties of the seabed.

Centre for Offshore and Remote Medicine (MEDICOR)

Dr. A.M. House, *Director* (709) 737-6483

Note: MEDICOR offers Continuing Medical Education programs for physicians working in the offshore and has collaborated with the Newfoundland and Labrador Institute of Fisheries and Marine Technology in the teaching of First Aid in their Basic Offshore Training Course which is mandatory for all workers proceeding to employment on the offshore. All courses are offered on an ad hoc basis.

Degrees Certificate Courses

- Refresher course for rig medics

Research Areas

- Bryant, D. • Data management systems.
 House, A.M. • Telehealth, communications, diving medicine.
 Keough, E. • Field program management.
 Manson, H.J. • Hyperbaric medicine, environment, respiration.
 Martin, J.R. • Research management.
 Mooney, M. • Field program management.
 O'Shea, C. • Diving medicine.
 Patel, V. • Diving medicine.
 Snellen, J.W. • Diving technology, heat exchanges with the environment.

Department of Chemistry

Department (709) 737-8772

Degrees None Courses

None

Research Areas

- Burnell, J.D. • Structure of marine sterols.
 Fallis, A.G. • Synthesis of marine natural products, terpenes and compounds of medicinal interest.

Department of Earth Sciences

Department (709) 737-8142

Degrees B.Sc(Hons)/M.Sc/Ph.D Courses

- Advanced marine geology
- Exploration geophysics
- Global dynamics and earth evolution
- Igneous petrology
- Sedimentology
- Glacial geology
- Marine geology
- Quaternary geology

Research Areas

- Aksu, A.E. • Marine geology, neogene and quaternary paleoclimatology and paleoceanography, sedimentology.
- Burden, E.T. • Palynology, biostratigraphy, taphonomy paleoecology: pollen, spores and dinoflagellates.
- Hay, A.E. • Physical oceanography, acoustic remote sensing.
- Iams, W.J. • Paleobiology and sedimentology.
- James, N.P. • Sedimentology.
- Macko, S.A. • Marine chemistry.
- Malpas, J.G. • Igneous petrology and geochemistry.
- Miller, H.C. • Marine and crustal geophysics, particularly gravity studies.
- Pereira, C.P. • Marine geology; sedimentology and sedimentary processes of the continental slope and iceberg scoured environments: Cenozoic foraminifera and biostratigraphy.
- Quinlan, G.M. • Geodynamic modelling.
- Rogerson, R.J. • Glaciology and glacial geomorphology.
- Welhan, J.A. • Stable isotope geochemistry, hydrothermal processes and mantle outgassing.
- Wright, J.A. • Marine geothermal heatflow, seismic reflection studies.

Department of Economics

Dr. Noel Roy, *Head* (709) 737-8245

Degrees B.A.(Hons)

Courses

- Advanced fisheries economics
- Basic fisheries economics

Research Areas

- Roy, N. • Natural resource economics; fishery policy and management.
- Schrank, W. • Natural resource economics; fishery policy and management.
- Tsoa, E. • Natural resource economics; fishery policy and management.

Faculty of Engineering and Applied Sciences

Naval Architecture Advisor (709) 737-8977

Ocean Engineering Advisor (709) 737-8805/8901

Degrees B.Eng/M.Eng/Ph.D

Courses

- Coastal and ocean engineering
- Computer aided ship design
- Fisheries engineering
- Marine engineering power plants
- Marine engineering systems
- Marine transportation system design
- Oceanography for engineers
- Ship design
- Ship dynamics
- Ship hull strength
- Ship operators management
- Ship status
- Ship structural analysis and design
- Ship structural vibratory response
- Ship structures (topics in)
- Shipbuilding production management

- Transportation engineering
- Applied remote sensing
- Corrosion of metals in aqueous media
- Earth structures
- Foundations for ocean structures
- Ice engineering (materials)
- Ice engineering (mechanics)
- Marine hydrodynamics
- Mechanics of ocean waves
- Momentum, mass and heat transfer
- Ocean acoustics
- Ocean and coastal hydraulics (special topics)
- Ocean engineering concepts
- Ocean engineering structures
- Ocean instrumentation and equipment
- Offshore soil mechanics
- Structural dynamics
- Transportation planning

Research Areas

- Allen, J.H. • Near shore structures, aquaculture.
- Bajzak, D. • Ice and ocean currents, remote sensing.
- Bass, D.W. • Ship statics and dynamics.
- Booton, M. • Offshore structures, vibrations.
- Bose, N. • Ship structure and propulsion methods.
- Chari, T.R. • Marine geotechnology, marine foundations, iceberg scour.
- Clark, J. • Geotechnical engineering.
- Dempster, R.T. • Fluid dynamics, icebergs, ocean engineering.
- Frés, D.A. • Ocean transportation, shipbuilding management, naval architecture.
- Haddar, M. • Ship hull vibrations, marine engineering.
- Hinchey, M.J. • Flow structure interactions, hovercraft technology, waves in ice, advanced icebreaker design.
- Hopkins, R.M. • Ocean corrosion, fatigue studies.
- Jordan, I.J. • Risk analysis of loading of offshore structures, ice mechanics.
- Krein, H.L. • Submersibles.
- Lever, J.H. • Flow induced vibrations, bergy bit dynamics.
- Marzovk, H. • Concrete design and analysis in oceans.
- Milne, W.J. • Naval architecture and shipbuilding.
- Morin, P. • Marine geotechnology, marine foundations.
- Muggeridge, D.B. • Environmental forces on offshore structures, wave tank.
- Sharp, J.J. • Ocean outfalls, hydraulics
- Swamidass, A.F.J. • Dynamics of ocean structures, fatigue of structural components.
- Vetter, W.J. • Acoustical sensing, object dynamics.
- Walsh, J. • Ocean communications, remote sensing.

Department of Geography*Department (709) 737-7417***Degrees** B.A.(Hons)/B.Sc(Hons)**Courses**

- Advanced conservation
- Fisheries geography (regional)
- Fisheries geography (systematic)
- Fisheries seminar
- Geography of the seas
- Historical geography of Newfoundland
- Lands and seas of the northern North Atlantic
- Newfoundland space economy
- Methodologies of fisheries geography
- Problems in fisheries geography

Research Areas

Draper, D. • Resource analysis, fishery, oceans, offshore, ethics, development, Newfoundland.

Handcock, W.G. • Migration and settlement in toponymy, Newfoundland, biography.

Mannion, J. • Cultural geography, Irish, migrations, Newfoundland, fishery.

Nowak, W.S. • Fishery, oceanography, Scandanavia, Iceland, Newfoundland.

Sanger, C.W. • Marine resources, Newfoundland, Scotland.

Scarlett, M.J. • Transportation, resource development, Newfoundland, urban studies.

Storey, K. • Socio-economic impacts, demography, petroleum, offshore, Newfoundland, development.

Department of History*Maritime History Advisor (709) 737-4476***Degrees** M.A./M.Phil/Ph.D**Courses**

- Maritime history of the North Atlantic to 1850
- Maritime history of the North Atlantic from 1850
- Maritime history (advanced studies in)

Research Areas

Cooper, M. • Nineteenth and twentieth century shipping, merchant marine.

Fischer, L.R. • History of shipping industry and merchant community.

Onmer, R.E. • Fishery, development/underdevelopment, shipping.

Panting, G. • Shipping.

Ryan, S. • Fishery.

Vickers, D. • Fishery, maritime labour.

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Marine Sciences Research Laboratory (MSRL)Dr. David R. Ealer, *Director (709) 726-6681*

The MSRL provides research facilities to carry out investigations in marine science. Research interests include: hormones which regulate growth, sexual maturation, spawning and salt balance in fish; role of antifreeze proteins in protecting fish against low temperatures; control of growth in kelp; physiological ecology of marine invertebrates; aquaculture of salmonids and bivalves; toxicology; parasitology; behaviour of fish and marine mammals; and neurophysiology. The Laboratory provides cold and heated sea water and fresh water systems. The Laboratory offers a variety of facilities for studying a wide range of aquatic flora and fauna at various temperatures and in various salinities. An isolated area is available for studies on fish behaviour. Large tanks are available for holding numbers of marine animals year round. A large wet laboratory facilitates a wide range of studies in fish physiology. There is a superb diving facility including a decompression chamber modified to permit studies on fish. The chamber is also available as a public service in an emergency. There is a well-equipped instrument laboratory, walk-in cold rooms, freezers and similar support facilities.

Maritime History GroupG. Panting, *Chairman*

The Maritime History Group initiates and encourages research into all aspects of maritime history and collects, organizes and makes available documentary and other materials relating to maritime history with a special emphasis on the North Atlantic Basin.

The Maritime History Group maintains an archive of material relating to shipping, fisheries, commerce and all activities relating to the sea from the 1600's to the present with a special emphasis on Newfoundland and British Imperial areas.

Department of Mathematics and Statistics*Ship Dynamics Advisor (709) 737-8783***Degrees** B.Sc(Hons)**Courses**

- Advanced differential equations
- Advanced mathematical modelling
- Fluid dynamics (introduction)
- Numerical analysis
- Partial differential equations

Research Areas

Bass, D.W. • Topology, catastrophe theory, icebergs, ship dynamics.

Gaskill, H.S. • Modelling, ice forecasting, icebergs, ship dynamics, iceberg scouring, fisheries.

Newfoundland Institute for Cold Ocean Science (NICOS)Dr. Richard Haezdrich, *Director* (709) 737-8833

The objectives of the Institute are to coordinate and promote research related to the development and exploitation of the cold oceans which are of importance to Newfoundland and Labrador; promote, initiate, sponsor and supervise research pertaining to the cold oceans; and to provide facilities for the development of ocean science programmes at the University. Research interests include: physical oceanography; geophysics; biological oceanography; seabird ecology; biochemistry; chemistry of marine natural products and regional geographic studies.

The Ocean Engineering Research GroupDr. D.B. Muggeridge, *Chairman* (709) 737-8812

The Group works closely with C-CORE, NICOS and the MSRL. The Group provides facilities and advice for ocean engineering research. Facilities include a 60m wave/tow tank, several smaller wave flumes, a 3.6 MN capacity structural testing facility and environmental chambers equipped for ice and related testing. Through the Group, students also have access to the facilities of the Institute for Marine Dynamics of the National Research Council of Canada which is located on campus.

Currently areas of research are: ocean geotechnology; ocean acoustics and telemetry; sea ice and icebergs; ocean structures and marine hydrodynamics; ocean communications and cold ocean pollution.

Department of **Physics***Physical Oceanography Coordinator* (709) 737-8888

Degrees M.Sc./Ph.D

Courses

- Ocean dynamics
- Physical oceanography
- Physical oceanography (special topics in)
- Polar oceanography
- Turbulence
- Waves and tides

Research Areas

- Hay, A.E. • Oceanography, acoustics, remote sensing, sediments.
- Greatbatch, R.J. • Oceanography, ocean circulation, numerical and analytic modelling, equatorial dynamics.
- Sanderson, B.G. • Oceanography, Lagrangian dynamics, eddy-diffusion, coastal dynamics.

Department of **Political Science***Department* (709) 737-8179

Degrees B.A.(Hons)

Courses

- International law
- International law (special topics)

Research Areas

- Hartmann, G. • International law, international adjudication and arbitration, law of treaties.
- Ksinska, B. • Public administration, resource policy and environmental impact.

Department of **Psychology***Biopsychology Advisor* (709) 737-8414

Note: An interdisciplinary program in Biopsychology is offered jointly by the Departments of Psychology and Biology. The programme in Biopsychology is designed to train students in behavioural research from the point of view of mechanism, development, function and evolution. Research problems range from field studies of sociobiological theory to experimental examination of the physiological processes governing behaviour. Students interested in marine related areas of biopsychology can tailor their courses and research in the areas of expertise that are available.

Degrees M.Sc./Ph.D

Courses

- Animal behaviour
- Animal behaviour (special topics)

Research Areas

- Lien, J. • Behaviour of whales and seabirds.
- Montevicchi, W.A. • Behaviour of seabirds.
- Renouf, D. • Behaviour and sensory physiology of harbour seals, marine mammals.
- Storey, A. • Behaviour of seabirds.

Department of **Sociology***Advisor* (709) 737-4592

Degrees B.A.(Hons)

Courses

- Man and the sea
- Persistence and change in rural society
- Sociology of agriculture and fisheries

Research Areas

- Hill, R.H. • Impact of sealing industry.
- House, D. • Fishery policy and inshore communities in Newfoundland, relationship between fishing and oil industries.
- Neis, B. • Technology and gender related issues in fish plants, health and safety in offshore trawlers.
- Sinclair, P.R. • Fish policy, social and technological change in the fishing industry.

Specialized Marine Programs

Aquaculture Technician — Certificate
 Boat Building — Certificate
 Marine Mechanics — Certificate

Departments, Institutes

Not available

Aquaculture Technician — Certificate

Note: all classes are held at the Huntsman Marine Laboratories, St. Andrews.

Duration 48 weeks

Content

- Aquaculture techniques
- Finfish
- Health and epidemiology of aquatic species
- Invertebrate culture
- Nutrition and feeding
- Operation and maintenance of hatchery facilities
- Structure and design of aquatic species

Boat Building — Certificate

Duration 88 weeks

Content

- Basic boat design
- Boat mechanical components
- Fiberglassing
- Lofting
- Marine drafting
- Rigging
- Round bottom tender construction

Marine Mechanics — Certificate

Duration 40 weeks

Content

- Auxiliary machinery
- Deck machinery
- Electrical systems
- Gas and diesel engines
- Hydraulic systems
- Propulsion and steering gear
- Transmissions
- Welding machinery

Extension Courses

Duration varies

Courses

- Aquaculture Worker (12 weeks)
- Electronic Navigation (2 weeks)
- Hydraulics for Fishermen (2 weeks)
- Marine Refrigeration (4 weeks)
- Navigation (7 weeks)
- Net Mending (3 weeks)
- Welding for Fisherman (4 weeks)

Specialized Marine Programs

Command Endorsement — Certificate
Deckhand Upgrading — Certificate
Fishing Master IV — Certificate
Fishing Master III — Certificate
Fishing Master II — Certificate
Marine Emergency Duties I — Certificate
Marine Emergency Duties II — Certificate
Marine Engineer Class IV — Certificate
Master Minor Water — Certificate
Master Small Craft (40 Ton) — Certificate
Watchkeeping Mate — Certificate

Departments, Institutes

Fisheries and Marine Training

Fisheries and Marine Training Division

Captain Ben West, *Director*.

Note: Several fishing and marine skills courses ranging from 5 days to 14 weeks in length including a self-study program are offered. Most courses are designed to assist the student in preparing for Department of Transportation examinations.

Duration varies.

Courses

- Basic Navigation
- Celestial Navigation
- Coastal Navigation
- Marine Emergency Duties I (MED I) — Certificate
- Marine Emergency Duties II (MED II) — Certificate
- Net Mending and Hanging
- Practical Fishery Skills
- Pre-sea Fishermen
- Small Commercial Vessel Engine Repair and Troubleshooting

Command Endorsement — Certificate

Duration 13 weeks

Content

- Chartwork and pilotage
- General seamanship
- Meteorology
- Ship management

Deckhand Upgrading — Certificate

Duration 12 weeks

Content

- Basic chartwork
- Engineering knowledge
- Fishing skills
- Marine emergency duties
- Seamanship

Fishing Master IV — Certificate

Fishing Master III — Certificate

Fishing Master II — Certificate

Duration 31 weeks each

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Marine emergency duties
- Meteorology
- Navigating instruments
- Navigation safety
- Ship management

Marine Engineer Class IV — Certificate

Duration Not available

Content

All areas of DOT syllabi are covered

Master Minor Water — Certificate

Duration 15 weeks

Content

- Chartwork and pilotage
- Marine emergency duties
- Ship's business and knowledge

Master Small Craft (40 Ton) — Certificate

Duration 4 weeks

Content

- Emergency duties
- Ship's business and knowledge

Watchkeeping Mate — Certificate

Duration 25 weeks

Content

- Chartwork and pilotage
- First aid
- General seamanship
- General ship knowledge
- Marine emergency duties
- Navigating instruments
- Navigation safety

**NORTH ISLAND
COLLEGE**

North Island College
156 Manor Drive,
Comox, British Columbia, V9N 6P7
Telephone (604) 339-5557

Specialized Marine Programs

Short intensive courses relating to fishing net repair, deckhand preparations, shipper-watchkeeper skills and fishing guide preparation are offered. Also, Marine Engineer Certificate candidates are invited to use local College centre resources and materials.

Courses

- Compass Work 1
- Fishing Deckhand 1
- Fishing Deckhand 2
- Fishing Guide 1
- Marine Emergency Duties I (MED I)
- Network and Rope Skills (seine and/or gillnet)
- Skipper Watchkeeper 1 or 1A
- Skipper Watchkeeper 2
- Small Vessel Skipper 1
- Stability 1
- Stability 2

NOVA SCOTIA SCHOOL OF FISHERIES

Principal

Nova Scotia School of Fisheries
P.O. Box 700
Pictou, Nova Scotia, B0K 1H0
Telephone (902) 485-4525/6410/8031/8032

Director of Training and Field Services

Nova Scotia Department of Fisheries
Telephone (902) 424-4560

Specialized Marine Programs

Deckhand Offshore Fleet — Certificate
Engine Room Watchkeeper — Certificate
Fishing Business Practice and Record Keeping — Certificate
Fishing Income Tax Update — Certificate
Fishing Master Class I — Certificate
Fishing Master Class II — Certificate
Fishing Master Class III — Certificate
Fishing Master Class IV — Certificate
Fishing Vessel Chief Engineer — Certificate
Inshore Fishing Operations; Bottom Trawls — Certificate
Inshore Fishing Operations; Gill Nets and Fish Traps — Certificate
Inshore Fishing Operations; Long Lines and Gear — Certificate
Inshore Fishing Operations; Otter Trawls — Certificate
Inshore Fishing Operations; Purse Seines — Certificate
Inshore Fishing Operations; Scottish and Danish Seines — Certificate
Introduction to Inshore Fishing Operations — Certificate
Lifeboatman Efficiency — Certificate
Marine Emergency Duties (Med I) — Certificate
Marine Emergency Duties (Med II) — Certificate
Marine Gas and Diesel Engine Maintenance — Certificate
Pre-Sea Training — Certificate
Refrigeration — Certificate
Trawlerman Offshore Fleet — Certificate

Deckhand Offshore Fleet — Certificate

Note: Intended to prepare students to become trawler deckhands.

Duration 4 weeks

Content

- Marine emergency and safety
- Net mending
- Rope work
- The bottom trawl
- Wire work

Engine Room Watchkeeper — Certificate

Duration 8 weeks

Content

- Bilge, ballast and domestic pumping systems
- Engine room equipment operation
- Engine room safety
- Marine auxiliary systems
- Marine diesel engines, main and auxiliary
- Shafting and propellers

Fishing Business Practice and Record Keeping — Certificate

Duration 3 weeks

Content

- Financial programmes
- General business practices
- How to insure a boat
- How to keep a record book
- How to register a fishing boat
- Income tax
- Payroll
- Subsidies
- The business entity

Fishing Income Tax Update — Certificate

Duration 1 week

Content

- Changes in tax laws
- Changes in unemployment insurance
- Current figures on Canada Pension
- Current rates of deductions and remittances
- Explanation of new forms and schedules
- Payments by installments
- Tax credits and their benefits
- Tax planning

Fishing Master Class I — Certificate

Duration 15 weeks

Content

- Astro navigation
- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigation safety

Fishing Master Class II — Certificate

Duration 13 weeks

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigating instruments
- Navigation safety
- Ship management

Fishing Master Class III — Certificate

Duration 12 weeks

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Navigating instruments
- Navigation safety

Fishing Master Class IV — Certificate

Duration 7 weeks

Content

- Chartwork and pilotage
- General seamanship
- Navigating instruments
- Navigation safety

Fishing Vessel Chief Engineer — Certificate**Note:** Intended to endorse 4th Class Engineers as Chief Engineer.

Duration 15 weeks

Content

- Auxiliary steam machinery
- Engine construction and operation
- Marine electrical systems
- Marine hydraulics
- Marine refrigeration
- Mathematics, mechanics and general engineering knowledge
- Pollution prevention

Inshore Fishing Operation: Bottom Trawls — Certificate**Note:** Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Construction and repair of fishing gear
- Fishing methods
- Practical rope and wire work
- Sea terms and vessel knowledge

Inshore Fishing Operations: Gill Nets and Fish Traps — Certificate**Note:** Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Construction of gill nets and fish traps
- Deck equipment
- Knowledge of gill nets and fish traps
- Repair of gill nets and fish traps
- Rigging aboard the vessel
- Trouble shooting

Inshore Fishing Operations: Long Lines and Gear — Certificate**Note:** Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Deck equipment
- Materials used in long lines
- Repairing long lines
- Rigging aboard the vessel
- Trouble shooting

Inshore Fishing Operations: Otter Trawls — Certificate**Note:** Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Construction of otter trawls
- Deck equipment
- Knowledge of otter trawls
- Repair of otter trawls
- Rigging aboard vessel
- Trouble shooting

Inshore Fishing Operations: Purse Seines — Certificate**Note:** Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Construction of purse seines
- Deck equipment
- Knowledge of purse seines
- Repair of purse seines
- Rigging aboard vessels
- Trouble shooting

Inshore Fishing Operations: Scottish and Danish Seines

— Certificate

Note: Course content may vary depending on geographical location and local demand.

Duration 6 weeks

Content

- Care of catch
- Construction of seines
- Deck equipment
- Knowledge of seines
- Repair of seines
- Rigging aboard vessels
- Trouble shooting

Introduction of Inshore Fishing Operations — Certificate

Note: Intended to provide fishermen with the knowledge and skill required to perform deck duties on all types of inshore fishing vessels.

Duration 4 weeks

Content

- Basic and advanced mending
- Splicing rope
- Splicing wire
- Tying knots, bends, hitches
- Working and mending mesh

Lifeboatman Efficiency — Certificate

Duration 3 days

Content

- First aid
- Lifesaving appliances

Marine Emergency Duties (MED I) — Certificate

Duration 1 week

Content

- Firefighting
- Lifesaving appliances
- Rescue, survival and first aid

Marine Emergency Duties (MED II) — Certificate

Duration 3 weeks

Content

- Firefighting
- Lifesaving appliances
- Rescue, survival and first aid

Marine Gas and Diesel Engine Maintenance — Certificate

Duration 4 weeks

Content

- Basic engine operation
- Electrical systems
- Engine tests and tune-ups
- Fuel systems
- Marine transmissions

Pre-Sea Training — Certificate

Note: Intended to introduce young people to the fishing industry.

Duration 12 weeks

Content

- Basic fishing gear technology
- Introduction to engineering
- Introduction to navigation
- Overview of the fishing industry
- Radio telephone
- Safety at sea

Refrigeration — Certificate

Duration 4 weeks

Content

- Maintenance and repair
- Theory of refrigeration cycle
- Types and applications of compression units

Trawlerman Offshore Fleet — Certificate

Duration 5 weeks

Content

- Advanced fishing gear knowledge and repair
- Care of catch
- First aid
- General seamanship
- Marine emergencies and safety equipment
- Review of deckhand course
- Shipboard personal hygiene

Specialized Marine Programs

Marine Fitter — Apprenticeship

Marine Fitter — Apprenticeship

 G.G. Grant, *Program Coordinator* (902) 424-5651

Duration 4 years

Content
Block One

- Basic electrics
- Basic mathematics and metrology
- Basic ship construction
- Bearing lubricant
- Blueprint reading
- Drives (power transmission)
- Fastening devices
- Fire fighting equipment
- Fuels (basic knowledge)
- Introduction to bearings
- Introduction to hydraulics
- Marine engines
- Pipe and piping systems
- Refrigeration and air conditioning (marine systems)
- Separators and cleaning equipment
- Shop (trade) practice
- Welding, brazing and soldering

Block Two

- Air compressors and pneumatic equipment
- Auxiliary machinery
- Basic science related to trade
- Bearing lubricant
- Bearing operation and maintenance
- Blueprint reading
- Deck machinery
- Diesel engine fuels
- Drives (power transmission)
- Electric circuit protection
- Hydraulic systems
- Marine diesel engines (ancillary systems)
- Marine steam turbines
- Pipe and pipe assemblies
- Welding and cutting

Block Three

- Auxiliary machinery
- Ballasting and trimming
- Bearings (general considerations)
- Blueprint reading
- Corrosion protection
- Deck machinery
- Diesel engine crankcase
- Diesel engine starting systems
- Drives (power transmission)
- Electric propulsion systems
- Explosions
- Governors
- Hydraulic system servicing
- Main engine reduction gearing
- Marine boilers (auxiliary)
- Marine diesel air and exhaust
- Marine gas turbine engines
- Pipe and valve assemblies
- Pneumatics
- Propellor, shaft and equipment
- Propulsion system turning gear
- Resilient mountings
- Steering and manoeuvring system

Block Four

- Blueprint reading
- Deck machinery
- Diesel engine maintenance and repair
- Engine installation
- Instrumentation
- Marine boilers (main)
- Metallurgy
- Pneumatic system control
- Refrigeration and air conditioning (marine systems)
- Shaft mounted equipment
- Steering systems

Nova Scotia Department of Vocational and Technical Training
P.O. Box 2086, Station "M",
Halifax, Nova Scotia, B3J 3B7
Telephone (902) 424-3290

Nova Scotia Nautical Institute
General Delivery,
Port Hawkesbury, Nova Scotia, B0E 2V0
Telephone (902) 625-2380

NOVA SCOTIA NAUTICAL INSTITUTE

Specialized Marine Programs

Coastal Navigation I — Certificate
Coastal Navigation II — Certificate
Command Endorsement — Certificate
Engineering Cadet — Certificate
First Mate Ferry Steamship — Certificate
Fishing Master 1st Class — Certificate
Fishing Master 2nd Class — Certificate
Fishing Master 3rd Class — Certificate
Fishing Master 4th Class — Certificate
Marine and Industrial Rigging — Certificate
Marine Emergency Duties I — Certificate
Marine Emergency Duties II — Certificate
Marine Emergency Duties III — Certificate
Marine Engineer 1st Class Steam, Motor or Combined — Certificate
Marine Engineer 2nd Class Steam, Motor or Combined —
Certificate
Marine Engineer 3rd Class Steam, Motor or Combined — Certificate
Marine Engineer 4th Class Steam, Motor or Combined — Certificate
Master (40 ton) — Certificate
Master Ferry Steamship — Certificate
Master Mariner — Certificate
Master Minor Waters — Certificate
Master Small Craft — Certificate
Navigation Cadet — Certificate
New Entry Seaman — Certificate
Ocean Navigator I — Certificate
Ocean Navigator II — Certificate
Petroleum Tanker Safety — Certificate
Tanker Familiarization — Certificate
Watchkeeping Mate — Certificate

Engineering Cadet — Certificate
Note: Offered at Port Hawkesbury.
Duration 10 months

Content

- Applied mechanics
- Blueprint reading and sketching
- Electricity
- Marine emergency duties
- Marine engineering (motor, steam)
- Naval architecture
- Ship construction
- Stability
- Thermodynamics

Marine and Industrial Rigging — Certificate

Note: Offered at Port Hawkesbury.

Duration 10 months

Content

- Basic knots, bends, hitches, ropes and their uses
- Basic mathematics pertaining to the trade mechanics
- Blocks and tackles, scaffolding and ladders, stresses and strains
- Blueprint reading and sketching
- Booms, towers, cranes and signalling
- Burning and cutting using oxy-acetylene equipment
- Computing breaking strengths and safe working loads
- Safety procedures and shop practices
- Sailmaking basics
- Slings, strapping, running and standing rigging
- Splicing natural and synthetic fibre and wire rope
- Use of socketing and special fittings

Marine Emergency Duties I — Certificate

Duration 1 week

Content

- First aid
- Lifesaving equipment
- Marine firefighting
- Rescue and survival

Marine Emergency Duties II — Certificate

Duration 3 weeks

Content

- First aid
- Lifesaving equipment
- Marine firefighting
- Rescue and survival

Marine Emergency Duties III — Certificate

Duration 1 week

Content

- Abandon ship
- Accident and fire prevention
- Bomb threat
- Damage control
- Emergency leadership
- Evacuation/medical assistance
- Fire management
- Man-over-board
- Maritime authority cooperation
- Onboard safety training
- Search and rescue operations
- Shipboard emergency organization
- Survivor rescue

Marine Engineer 1st Class Steam, Motor or Combined — Certificate
Marine Engineer 2nd Class Steam, Motor or Combined — Certificate
Marine Engineer 3rd Class Steam, Motor or Combined — Certificate
Marine Engineer 4th Class Steam, Motor or Combined — Certificate

Duration Varies

Content

- Applied mechanics
- Applied thermodynamics
- Electrotechnology
- Engineering drawing and blueprint reading
- General engineering knowledge
- Marine emergency duties
- Motor engineering knowledge
- Naval architecture and ship construction
- Practical mathematics
- Steam engineering knowledge

Navigation Cadet — Certificate

Note: Offered at Port Hawkesbury

Duration 10 months

Content

- Cargo work
- Chartwork
- Collision regulations
- Marine emergency duties II
- Meteorology
- Navigation principles
- Practical navigation
- Seamanship
- Ship construction and stability
- Wire and rope splicing

New Entry Seaman — Certificate

Note: Offered at Port Hawkesbury.

Duration 3 months

Content

- Agreements
- Cargo work
- Chain of authority
- Distress procedures
- Emergency procedures
- Nautical terminology
- Safety procedures
- Sea service
- Seamanship
- Splicing wire and fibre rope
- Types and part of ships
- Watchkeeping systems and routine duties

Petroleum Tanker Safety — Certificate

Duration 1 week

Content

- Applied science
- Cargo handling systems
- Codes of practice
- Emergency procedures
- Fire prevention, extinguishing
- First aid
- Inert gas systems
- Operating procedures
- Tank cleaning and crude oil washing
- Tanker design and development
- Terminal operations safety

Tanker Familiarization — Certificate

Duration 2 days

Content

- Accident and fire prevention
- Emergency procedures
- Hazards of bulk oil transfer
- Terminal operations safety

Specialized Marine Programs

None

Departments, Institutes

Biology
Droit
Geography
Geology
Huntsman Marine Laboratories

Department of **Biology**

J. McNeill, *Chairman* (613) 564-2336

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Biology of fishes
- Invertebrate zoology
- Advanced ichthyology
- Evolution and adaption in fish
- Fish physiology

Research Areas

None

Département de **Droit**

Directeur (613) 564-2254

Niveaux LL.L

Cours

- Droit maritime

Domaines de recherche

Aucun

Department of **Geography**

P.G. Johnson, *Director* (613) 564-2395

Degrees B.A.(Hons)

Courses

- Coastal geomorphology
- Fluvial geomorphology
- Quaternary environments
- Resource management: coastal and shoreline environments

Research Areas

None

Department of **Geology**

W.K. Fyson, *Chairman* (613) 564-3481

Degrees B.Sc(Hons)

Courses

- Eléments de géologie
- Géologie générale
- Principles of geology
- Quaternary environments

Research Areas

None

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Specialized Marine Programs:

B.C. Coast Pilot Exam Preparation — Certificate
Coastal Navigator I — Certificate
Coastal Navigator II — Certificate
Command Endorsement — Certificate
Deckhand Training — Certificate
Fishing Gear Training — Courses
Fishing Master I — Certificate
Fishing Master II — Certificate
Fishing Master III — Certificate
Fishing Master IV — Certificate
Marine Emergency Duties I — Certificate
Marine Emergency Duties II — Certificate
Marine Emergency Duties III — Certificate
Marine Engineer — Diploma
Marine Engineer 1st Class — Certificate
Marine Engineer 2nd Class — Certificate
Marine Engineer 3rd Class — Certificate
Marine Engineer 4th Class — Certificate
Master Mariner — Certificate
Master Minor Waters — Certificate
Ocean Navigator I — Certificate
Ocean Navigator II — Certificate
Simulated Electronic Navigation I — Certificate
Simulated Electronic Navigation II — Certificate
Watchkeeping Mate — Certificate
Watchkeeping Mate Endorsement — Certificate

B.C. Coast Pilot Exam Preparation — Certificate

Duration 3 weeks

Content

- Behaviour of large vessels in restricted draft conditions or in proximity to other vessels/shore
- Review of local regulations
- Review of rules of the road

Coastal Navigator I — Certificate

Content

- Cargo
- Chartwork and pilotage
- General seamanship
- Industrial safety and ship management
- Marine engineering practice
- Meteorology
- Navigation safety

Coastal Navigation II — Certificate

Content

- Cargo
- Chartwork and pilotage
- General seamanship
- Industrial safety and ship management
- Marine engineering practice
- Meteorology
- Navigation safety

Command Endorsement — Certificate

Note: This program serves to endorse a Watchkeeping Mate Certificate to further qualify the holder to act as master in the home-trade, of a vessel not exceeding 350 tons, gross tonnage or a tug of any size.

Duration Not available

Content

- Chartwork and pilotage
- General seamanship
- Meteorology
- Ship management

Deckhand Training — Certificate

Note: This program provides some pre-employment training for persons entering the industry as deckhands.

Duration 6 weeks

Content

- Marine emergency duties II
- Safety practices
- Seaman's duties and responsibilities
- Ship familiarization

Fishing Gear Training — Courses

Duration 6 weeks

Courses

- Design, construction and alteration of nets (4 weeks)
- Mesh repair (1 week)
- Wire rope work (1 week)

Fishing Master I — Certificate

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigation safety

Fishing Master II — Certificate

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Meteorology
- Navigating instruments
- Navigation safety
- Ship management

Fishing Master III — Certificate

Content

- Chartwork and pilotage
- Communications
- General seamanship
- General ship knowledge
- Navigating instruments
- Navigation safety

Fishing Master IV — Certificate**Content**

- Chartwork and pilotage
- General seamanship
- Navigating instruments
- Navigation safety

Marine Emergency Duties I — Certificate

Duration 5 days

Content

- Accident prevention
- Firefighting procedures
- First aid
- Life raft operation
- Survival techniques

Marine Emergency Duties II — Certificate

Duration 15 days

Content

- Firefighting
- First aid
- Launch and use of lifeboats
- Survival gear use

Marine Emergency Duties III — Certificate

Duration 5 days

Content

- Firefighting
- First aid
- Launch and use of lifeboats
- Survival gear use

Marine Engineer — Diploma

Duration 33 months including work practicum

Courses

- Applied mechanics
- Electrical theory
- Electronic, hydraulic and pneumatic control systems
- Engine overhaul
- Gas and electric welding
- Marine engineering ship systems
- Mathematics
- Naval architecture
- Shipboard routines and 2 months sea time
- Thermodynamics

Marine Engineer 1st Class — Certificate**Content**

- Drafting
- Electrotechnology
- General marine engineering principles and practice
- Marine internal combustion machinery
- Marine steam machinery
- Mechanics
- Stability and ship construction
- Thermodynamics

Marine Engineer 2nd Class — Certificate**Content**

- Drafting
- Electrotechnology
- General marine engineering principles and practice
- Marine internal combustion machinery
- Marine steam machinery
- Mechanics
- Stability and ship construction
- Thermodynamics

Marine Engineer 3rd Class — Certificate**Content**

- General marine engineering principles and practice
- Marine internal combustion machinery
- Marine steam machinery
- Practical mathematics

Marine Engineer 4th Class — Certificate**Content**

- General marine engineering principles and practice
- Marine internal combustion machinery
- Marine steam machinery

Master Mariner — Certificate**Content**

- Electrical theory and practice
- General seamanship
- Marine engineering practice
- Radio and electronic aids to navigation
- Ship management
- Stability

Master Minor Waters — Certificate**Content**

- Chartwork and pilotage
- Ships business and knowledge

Ocean Navigator I — Certificate**Content**

- Cargo
- Chartwork and pilotage
- General seamanship
- Industrial safety and ship management
- Meteorology
- Navigation safety
- Ocean navigation
- Ship construction and marine engineering

Ocean Navigator II — Certificate

Content

- Cargo
- Chartwork and pilotage
- General seamanship
- Industrial safety and ship management
- Meteorology
- Navigation safety
- Ship construction and marine engineering

Simulated Electronic Navigation I — Certificate

Duration 6 weeks

Content

Not available

Simulated Electronic Navigation II — Certificate

Duration 2 weeks

Content

Not available

Watchkeeping Mate — Certificate

Duration Not available

Content

- Chartwork and pilotage
- General seamanship
- General ship knowledge
- Navigating instruments
- Navigation safety

Watchkeeping Mate Endorsement — Certificate

Note: This program serves to endorse a 350 Ton Master's Certificate to further qualify the holder to act as a watchkeeping mate of a vessel of any tonnage on any voyage.

Duration Not available

Content

- Navigating instruments
- Navigation safety

Specialized Marine Programs

None

Departments, Institutes

Biology
Chemistry
Civil Engineering
Economics
Geography
Law

Department of **Biology**

D.T. Dennis, *Head*

Degrees B.Sc(Hons)

Courses

- An introduction to algae
- Biology of invertebrates
- Population and community ecology
- Population ecology
- Vertebrate anatomy

Research Areas

None

Department of **Chemistry**

V.H. Smith, *Head*

Degrees B.Sc(Hons)

Courses

- Environmental chemistry
- Marine chemistry

Research Areas

None

Department of **Civil Engineering**

Degrees B.Eng

Courses

- Hydrodynamics of coasts and estuaries
- Water waves

Research Areas

None

Department of **Economics**

R.W. Broadway, *Head*

Degrees B.A.

Courses

- Natural resource economics

Research Areas

None

Department of **Geography**

B.S. Osborne, *Head*

Degrees B.A.

Courses

- Arctic environments
- Environments and technology

Research Areas

None

Department of **Law**

V. Bartley, *Registrar* (613) 545-2220

Degrees LL.B.

Courses

- Environmental planning law and administration
- International environmental and resource law
- Transnational legal policy

Research Areas

None

Note: Admission is limited to officers in the Canadian forces.

Specialized Marine Programs

Oceanography — Diploma
 Oceanography and Acoustics — BSc/MSc

Departments, Institutes

Interdisciplinary

Interdisciplinary

Dr. D.P. Krauel (604) 380-4580

Note: The diploma programme in Oceanography is an 8 month programme.

Courses

- Acoustics
- Descriptive oceanography
- Dynamic oceanography
- Geological and geophysical oceanography
- Marine information processing
- Ocean acoustics
- Ocean dynamics
- Oceanographic methods
- Synoptic oceanography

Research Areas

Collins, J.S. • Underwater acoustics; marine environments; submersibles.

Duffus, H.J. • Remote sensing of ocean features; acoustics oceanography.

Gilliland, J.M. • Geomagnetism.

Krauel, D.P. • Estuarine and coastal processes; waves; ocean fronts; turbulent diffusion.

MacFarlane, W.T. • Geomagnetism; coastal and nearshore processes.

Marsden, R.F. • Shelf dynamics; waves; ocean fronts.

Milinzazzo, F. • Fluid dynamics; numerical modelling.

Mothersill, J.S. • Paleo-oceanography; geomagnetism.

Ousey, G.J. • Acoustic oceanography.

Press, M.J. • Remote sensing of ocean features.

Reimer, K.J. • Chemical speciation, marine environments.

Robinson, M.G. • Plankton; marine fouling.

Schurer, P.J. • Sub-bottom profiling.

Stacey, M.W. • Coastal and shelf dynamics.

Waddell, S.R. • Ocean acoustics, Arctic oceanography.

Wilmot, M.J. • Acoustic signal processing.

Wolfe, W.W. • Acoustic signal processing.

Specialized Marine Programs

Civil Engineering Technology: Marine Option — Diploma
Commercial and Industrial Diving — Certificate
Hyperbaric Chamber Operator — Certificate
Resources Engineering Technology: Marine Option — Diploma
Underwater Skills — Certificate

Departments, Institutes

Not available

Civil Engineering Technology: Marine Option — Diploma

Duration 3 year cooperative program

Courses:

- Marine engineering
- Marine facility construction
- Marine surveying and hydrography
- Oceanography

Commercial and Industrial Diving — Certificate

Duration 37 weeks

Content

- Applied mechanics and navigation
- Diving systems
- Diving theory
- Marine emergency duties
- Non-destructive testing
- Offshore diving
- Rigging
- Underwater welding

Hyperbaric Chamber Operator — Certificate

Duration 37 weeks

Content

- Compressors and locks
- C.S.A. standards and record keeping
- Electrical sub-systems
- Emergency procedures
- History of hyperbaric chambers
- Maintenance and safety precautions
- Oxygen supplies

Resources Engineering Technology: Marine Option — Diploma

Duration 3 year cooperative program

Courses

- Hydraulics and hydrology
- Marine design and engineering
- Marine surveying
- Oceanography
- Underwater sampling

Underwater Skills Program — Certificate

Duration 37 weeks

Content

- Commercial diving equipment use
- Non-destructive testing certification
- Offshore diving techniques
- Underwater construction and salvage

Specialized Marine Programs

Fisheries (Economic) Management (Economics) — M.A./Ph.D
 Fisheries (Resource) Management (Natural Resources
 Management) — MRM
 Marine Science (Bamfield Marine Station, Biological Sciences) —
 B.Sc(Hons)/M.Sc/Ph.D

Departments, Institutes

Bamfield Marine Station
 Biological Sciences
 Economics
 Geography
 Institute of Fisheries Analysis
 Kinesiology
 Natural Resources Management

Bamfield Marine Station

(See under Bamfield Marine Station in Annex)

 Department of **Biological Sciences**

Undergraduate Advisor (604) 291-3292/4475

Graduate Advisor (604) 291-3539/4161

Note: Additional marine science courses are held at
 the Bamfield Marine Station.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Advanced invertebrate biology
- Animal ecology
- Biology of non-vascular plants
- Endocrinology
- Environmental physiology of animals
- Ethology
- Fish biology
- Invertebrate biology
- Marine biology and oceanography
- Ornithology
- Population dynamics
- Vertebrate biology
- Aquatic ecology
- Behavioural ecology seminar
- Comparative endocrinology
- Marine microbiology
- Marine plant ecology
- Population processes
- Reproductive strategies
- Selected topics in population ecology
- Survival strategies

Research Areas

- Albright, L.J. • Marine microbiology; ecology; physiology and
 biochemistry of marine microbes; fish diseases.
- Druehl, L.D. • Marine phycology and ecology with emphasis on
 kelp biology and mariculture.
- Fankboner, P.V. • Marine invertebrate biology; Mollusca and
 Echinodermata.
- Geen, G.H. • Marine and freshwater ecology, productivity;
 salmonid ecology; toxicology.
- Hartwick, E.B. • Marine ecology; benthos; invertebrates; molluscs.
- Farrell, A.P. • Cardiovascular physiology of fish; environmental
 toxicology.
- Gross, M.R. • Evolutionary fish ecology.
- Srivastava, L.M. • Physiology, chemistry and biochemistry
 of seaweeds.

Department of Economics*Graduate Advisor* (604) 291-4543**Degrees** M.A./Ph.D**Courses**

- Economic fisheries management
- Fisheries economics
- International economic trade problems
- Resource development and conservation

Research Areas

Copes, P. • Fisheries economics, regional development, political economy.

Knetsch, J.L. • Natural resources, law and economics, environmental economics.

Munro, J.M. • Transportation, regional and urban economics.

DeVoretz, D.J. • Economic development, economic history.

Easton, S.T. • International trade, economic history.

Heaps, T.M. • Natural resources, regional economics.

Schwindt, R.W. • International trade; industrial organization.

Department of Geography*Graduate Advisor* (604) 291-3321**Degrees** B.A.(Hons)/M.A./Ph.D**Courses**

- Geography of resource management
- Resources management

Research Areas

Day, J.C. • Resource and environmental management.

Wong, S.T. • Resources management.

Institute of Fisheries AnalysisDr. Parzival Copes, *Director* (604) 291-4893

Established in 1980, the Institute promotes research and study of a broad range of questions, and accommodates visiting scholars, concerned with fisheries. Areas of interest include the basic biology, ecology and population dynamics of exploitable fish stocks, the bio-economic and socio-economic well-being of fishing communities, industrial and commercial developments related to fisheries, and the political economy of the fishing industry. The Institute encourages interdisciplinary team research among its members, and maintains a Fisheries Research Papers Series. Where appropriate, it will administer members' research projects and undertake contract research, utilizing the services of its members as research principals.

Department of Kinesiology*Graduate Advisor* (604) 291-3576*Undergraduate Advisor* (604) 291-3572**Degrees** BSc(Hons)/MSc/PhD**Courses**

- Man beneath the sea
- Environmental physiology

Research Areas

Hedges, D.G. • Environmental and hyperbaric medicine.

Allen, M. • Diving medicine.

Banister, E.W. • Submersibles and diving; environmental physiology; oxygen toxicity problems in diving physiology.

Fadl, S. • Environmental physiology; safety procedures and practices.

Mekjavic, I.B. • Environmental physiology; toxicology; submersibles and diving.

Morrison, J.B. • Diving technology; bioengineering; hyperbaric physiology.

Natural Resources Management ProgramJ. Chadwick Day, *Director* (604) 291-4659/4780

Note: This is a professional program designed for individuals with experiences in private organizations or public agencies dealing with resources and for recent graduates in various disciplines related to natural resources management. The aim is to develop increased familiarity and competence in understanding selected aspects of the resources base, strategies and techniques of natural resource analysis and management and the biological, social and economic implication of resource decisions.

Degrees M.R.M.**Courses**

- Applied geomorphology and hydrology
- Applied population and community ecology
- Economics of natural resources
- Environmental and social impact assessment
- Law and resources
- Management models of biological resources
- Natural resources management
- Project evaluation
- Regional planning
- Topics in fisheries management

Research Areas

Peterman, R.M. • Fisheries population dynamics and management, simulation modelling, environmental assessment.

Specialized Marine Programs

Coastal and Marine Studies (Geography) — B.A.(Hons)

Departments, Institutes

Atlantic Canada Studies

Biology

Chemistry

Economics

Geography

Geology

Gorsebrook Research Institute for Atlantic Canada Studies

Sociology

 Committee on **Atlantic Canada Studies**

 Dr. L.G. Barrett, *Coordinator* (902) 420-5879

Note: Atlantic Canada Studies is an inter-disciplinary major option in the Arts Faculty developed to meet the increasing demand for a more organized study of Atlantic Canada.

Degrees B.A.(Hons)/M.A.

Courses

- Atlantic fisheries
- Northwest Atlantic
- Atlantic Canada ecology and resources

Research Areas

Barrett, L.G. • Resource development, regionalism, fisheries.

Charles, T. • Economics of fisheries management.

Cone, D. • Diseases of fishes.

Connelly, P. • Labour, industrial relations, and women.

Day, D. • Regional development, fisheries, offshore developments.

McCalla, R. • Ports and shipping, economic geography.

MacDonald, M. • Labour, women and development in fishing communities.

Wiles, M. • Atlantic fisheries ecology.

 Department of **Biology**

 Dr. E. Unturbe-Rojo, *Chairperson* (902) 420-5643

Degrees B.Sc.(Hons)

Courses

- Atlantic fisheries
- Biology of fishes
- Experimental fish embryology
- Introduction to marine sciences
- Marine invertebrates

Research Areas

Cone, D.K. • Diseases of fishes.

Wiles, M. • Diseases and parasites of marine and freshwater fishes with particular emphasis on Nova Scotia and Bermuda.

 Department of **Chemistry**
Degrees B.Sc.(Hons)

Courses

- Marine chemistry

Research Areas

Bridgeo, W.A. • Developing models for teaching purposes.

 Department of **Economics**

 Dr. A.S. Harvey, *Chairperson* (902) 420-5671

Degrees B.A.(Hons)

Courses

- Atlantic economy seminar
- Economics of natural resources and environmental management
- Fisheries economics
- The Atlantic economy

Research Areas

Charles, T. • Fishery bio-economics, investment and development.

MacDonald, M. • Community development and labour issues in Atlantic fisheries.

Department of GeographyDr. R.M. McCalla, *Chairperson* (902) 420-5736**Degrees** B.A.(Hons)**Courses**

- Coastal geomorphology
- Coastal management
- Fisheries development
- Geography of ports
- Geography of shipping
- Mankind and the oceans: a political and historical geography
- Mankind and the oceans: an economic geography
- Northwest Atlantic
- Physical geography of the oceans

Research Areas

Day, E.E. • Energy and fisheries.

McCalla, J. • Ocean transportation and sea ports.

Ricketts, J. • Coastal zone management, coastal geomorphology, atlas and mapping of ocean resources.

Department of GeologyDr. J. Dostal, *Chairperson* (902) 420-5746**Degrees** B.Sc(Hons)**Courses**

- Global geology
- Introduction to micropaleontology
- Micropaleontology of ostracoda and foraminifera
- Stratigraphy and sedimentation
- Tectonics

Research Areas

Pe-Piper, G. • Igneous rocks off oilwells of Atlantic Canada.

Siddiqui, Q.A. • Micropaleontology of Ostracoda and Foraminifera.

Waldron, J. • Marine sedimentary rocks, ophiolites in Canadian Appalachians.

Gorsebrook Research Institute for Atlantic Canada StudiesDr. Kenneth MacKinnon, *Executive Director* (902) 420-5668

The primary aim of the Institute is to encourage and facilitate research pertaining to Atlantic Canada and to disseminate research findings to the regional, national and international communities. The Institute emphasizes interdisciplinary, inter-university and university/other sector research cooperation. Particular emphasis is given to the study of regional political economy, resource development and the culture of the Atlantic Provinces.

Marine research interests include: the social and economic development of the fishing industry in Nova Scotia; the future of fisheries policy; the impact of oil and gas development; and women in fishing communities.

Department of SociologyDr. P. Connelly, *Chairperson* (902) 420-5871**Degrees** B.A.(Hons)**Courses**

- Rural sociology
- Sociology of Atlantic Canada

Research Areas

Barrett, L.G. • Structure of the fishing industry (fish processing) in Nova Scotia.

Connelly, P. • Women and development in fishing communities.

McMullan, J. • Piscatorial crime in the fishery.

Perrier, D. • Piscatorial crime in the fishery.

**SIR SANFORD FLEMING
COLLEGE**

Sir Sanford Fleming College
Brealey Drive,
Peterborough, Ontario, K9J 7B1
Telephone (705) 743-5610

Specialized Marine Programs

Marine Mechanic — Apprentice

Marine Mechanic — Apprentice

Duration program consists of two periods of 2,000 hours each, including two in-school sessions of 10 weeks each.

Courses

- Blueprint reading
- Communications
- Trade calculations
- Trade practical
- Trade theory
- Welding

Specialized Marine Programs

None

Departments, Institutes

Biology
Economics
Geography

Department of **Biology**

T. Matthews, *Chairman* (705) 748-1424

Degrees B.Sc(Hons)

Courses

- Algae biology
- Biology of algae
- Fish biology
- Marine biology
- Vertebrate zoology

Research Areas

Berrill, M. • Marine crustaceans.

Powles, P.M. • Ichthyology, larval and reproductive ecology of fishes.

Sandeman, I. • Zooans and pellae in coral.

Department of **Economics**

D.C.A. Curtis, *Chairman*

Degrees B.A.(Hons)

Courses

- Natural resource economics

Research Areas

None

Department of **Geography**

Degrees B.A.(Hons)

Courses

- Biogeography

Research Areas

Adams, W.P. • Arctic geography.

Marsh, J. • Marine parks.

Specialized Marine Programs

Food Science (Canadian Institute of Fisheries Technology, Food Science and Technology) — M.Sc/Ph.D
 Ocean Engineering & Naval Architecture (Mechanical Engineering) — M.Eng/M.A.Sc/Ph.D

Departments, Institutes

Canadian Institute of Fisheries Technology
 Civil Engineering
 Continuing Education
 Food Science and Technology
 Mechanical Engineering
 Mining Engineering

Canadian Institute of Fisheries Technology

Dr. M. Tung, *Director* (902) 429-8300

The Institute is essentially a specialized resource centre for graduate education and research in fish process engineering and seafood science. As a government approved centre for advanced technology, it also provides research and development services on a cost-recovery basis to industry and to various governmental and international agencies. The Institute promotes technology transfer and the development of advanced technology aimed at more effective commercial utilization of fish. The Institute offers unique opportunities for graduate training and research with emphasis on: aquaculture technology, food biochemistry, fats and oils, food process engineering and seafood technology.

Department of Civil Engineering

Dr. D.H. Waller, *Head* (902) 429-8300

Degrees MEng/PhD

Courses

- Coastal hydraulics

Research Areas

Baikie, L.D. • Marine soils.

Potyondi, Dr. J.G. • Polymer concrete in marine environments.

Department of Continuing Education

H.N. Ahuja, *Director* (902) 429-8300

Note: The Department offers "Ocean Seminars" on a continuing basis. The content, duration and location of each seminar varies to fit the needs expressed by the community. Among others, topics have included:

- Aquaculture
- Cold ocean materials applications
- Corrosion
- Fishing industry management
- Ice engineering
- Naval architecture
- Ship chartering
- Signal processing and applications
- Welding for cold oceans

Department of Food Science and Technology

Degrees M.Sc/Ph.D

Courses

- Chemistry of fats, oils, lipids
- Fish process engineering
- Fish processing
- Food chemistry
- Food proteins and enzymes

Research Areas

Ablett, R.F. • Plasma phospholipase activity in frozen fish; submersible retention of marine cultivated salmon; surimi.

Ackman, R.G. • Salmon parr nutrition; mammals.

Gill, T.A. • Frozen fish muscle; seafood quality assessment; canning industry data acquisition.

Merritt, J.A. • Salt fish; development of fish-smoking kilns; submersibles structures for shellfish culture; industrial thawing of fish.

Tung, M. • Seafood rheology, thermal processing and packaging.

Department of Mechanical Engineering

Dr. C.R. Hazell, *Head* (902) 429-8300

Degrees M.Eng/M.A.Sc/Ph.D

Courses

- Coastal and ocean engineering
- Dynamics of offshore engineering
- Marine hydrodynamics
- Marine propeller theory
- Ocean/ship structure analysis
- Production methods for ships & marine systems
- Propulsion machinery
- Ship design
- Ship dynamics
- Ship resistance and propulsion
- Ship statics
- Ship structure analysis and design

Research Areas

Rahman, M. • Tidal response in estuaries; wave loading on fixed and floating structures; thermal stratification in large bodies of water.

Russell, L.T. • Residual stress determination using blind-hole drilling techniques.

Warner, J.L. • Offshore pipeline dynamics; sediment transport criteria for offshore pipelines.

Watts, K.C. • Ocean wave energy extraction; fishing net computer simulation.

Department of Mining Engineering

Dr. L.A. Adorjan, *Head* (902) 429-8300

Degrees M.Eng/Ph.D

Courses

- Offshore drilling and production
- Petroleum engineering

Research Areas

Leewis, K.G. • Castings for low temperature service offshore.

Rockwell, M.C. • Eastern Canadian iron ore as a weighting agent for offshore drilling; barite impurities impact on drilling mud.

Specialized Marine Programs

- Coastal and Ocean Engineering (Civil Engineering) —
M.A.Sc./M.Eng./Ph.D
- Fish Biology and Aquaculture (Zoology) —
B.Sc./M.Sc./Ph.D
- Geological Engineering (Geological Sciences) —
M.Sc./M.Eng./Ph.D
- Marine Biology (Bamfield Marine Station, Biology Program) —
B.Sc./M.Sc./Ph.D
- Naval Architecture (Mechanical Engineering) —
B.A.Sc./M.A.Sc./Ph.D
- Oceanography (Oceanography) — B.Sc(Hons)/M.Sc/Ph.D
- Remote Sensing (Remote Sensing Council) — M.Sc/Ph.D
- Renewable Resource Management (Resource Management
Science Committee) — M.Sc/Ph.D

Departments, Institutes

- Bamfield Marine Station
- Biology Program
- Botany
- Civil Engineering
- Commerce and Business Administration
- Community and Regional Planning
- Economics
- Geography
- Geological Sciences
- Institute of International Relations
- Law
- Mechanical Engineering
- Oceanography
- Remote Sensing Council
- Resource Management Science Committee
- Zoology

Bamfield Marine Station

(See under Bamfield Marine Station in Annex)

Department of Biology Program

Chairman (604) 228-4260

Note: Other marine science courses are offered at
the Bamfield Marine Station.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Marine ecology
- Marine benthic ecology

Research Areas

Not available

Department of Botany

Telephone (604) 228-2133

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Algal physiology
- Biology of marine algae
- Survey of algae
- Practical marine phytoplankton

Research Areas

- Bisalputra, T. • Marine phytoplankton.
- DeWreede, R.E. • Marine algal ecology.
- Foreman, R.E. • Marine algal ecology.
- Harrison, P.G. • Sea grasses.
- Oliveira, L. • Marine planktonic organisms, pollution effects.
- Taylor, F.J.R. • Marine phytoplankton, dinoflagellates.

Department of Civil Engineering

Advisor (604) 228-4338

Degrees M.A.Sc/M.Eng/Ph.D

Courses

- Coastal engineering
- Fluid loading on structures
- Water resources development
- Dynamics of structures
- Estuary hydraulics
- Experimental soil mechanics
- Finite elements
- Fluid mechanics
- Geotechnical ocean engineering
- Numerical methods in soil mechanics
- Water pollution control engineering

Research Areas

- Campanella, R.G. • Geotechnical exploration, in-situ and
laboratory testing of soils.
- Finn, W.D. • Numerical analysis of soil systems, soil dynamics.
- Isécsón, M. • Off-shore structures, wave forces, wave propagation.
- Lawrence, G.A. • Coastal and ocean processes.
- Olson, M.D. • Finite element analysis of solid and fluid systems.
- Quick, M.C. • Open and closed channel hydraulics, snow
hydrology, sediment transport.
- Vaid, Y.P. • Laboratory analysis of soil systems.

Faculty of Commerce and Business Administration

Advisor (604) 224-8500

Degrees B.Comm/M.B.A./M.Sc(Bus Admin)/Ph.D

Courses

- Canadian transportation
- Transportation in economic development
- Transportation management
- Water transportation
- Transportation
- Transportation economics
- Transportation policy

Research Areas:

Not available

School of Community and Regional PlanningProfessor Brahm Wiesman, *Director* (604) 228-3276

Degrees M.A./M.Sc./Ph.D

Courses

- Regional transportation planning

Research Areas

Not available

Department of Economics*Advisor* (604) 228-2876

Degrees B.A.(Hons)/M.A./Ph.D

Courses

- Economics of renewable resources
- Problems in natural resource use
- Economic analysis and natural resources
- Economics of resource use (special topics in)

Research Areas

Not available

Department of Geography*Department* (604) 228-2663

Degrees B.A.(Hons)/B.Sc(Hons)/M.A./M.Sc/Ph.D

Courses

- Geography of resource industries
- Geomorphological processes
- Satellite remote sensing applications to oceanography and meteorology

Research Areas

Not available

Department of Geological Sciences*Advisor* (604) 228-2804

Note: The Geological Engineering Program draws its courses from the Departments of Geological Sciences; Civil Engineering; Mining and Mineral Process Engineering; Geophysics and Astronomy; and Oceanography. Areas of study written in the Program include: sedimentology or stratigraphy, marine, surficial, structural, and environmental geology.

Degrees B.Sc/M.Sc/Ph.D

Courses

- Marine geology
- Geodynamics
- Problems in carbonate geology

Research Areas

Chase, R.L. St. L. • Marine tectonics; basalt petrology.

Institute of International RelationsDr. M.W. Zacher, *Director* (604) 228-5480

The Institute was established in 1970 to promote and organize multidisciplinary research projects on international relations. The Institute supports research projects at all levels through grants, fellowships, professional conferences, publication subsidies and other services. Major emphasis at present is on international regulatory problems. The Institute also sponsors work on international oceans problems and strategic studies including: fishing, sea-bed mining, navigation, marine pollution, and military uses of the oceans.

Faculty of Law*Department* (604) 228-3151

Degrees L.L.B./L.L.M.

Courses

- Environmental law
- Law of the sea
- Maritime law
- Natural resources law
- Topics in natural resources law
- Water law

Research Areas

Not available

Department of Mechanical Engineering*Advisor, Naval Architecture* (604) 228-3896

Degrees B.A.Sc/M.A.Sc/Ph.D

Courses

- Computer aided ship design
- Experimental naval architecture
- Project and design laboratory
- Ship resistance and propulsion
- Ship structures and vibration
- Statics of marine vehicles
- Dynamics of marine vehicles
- Marine hydrodynamics

Research Areas

Calisal, S.M. • Hydrodynamics of ships.

Dunwoody, B. • Probabilistic methods in ship hydrodynamics.

Vaughan, H. • Ship structures.

Department of Oceanography*Undergraduate Advisor* (604) 228-4511*Graduate Advisor* (604) 228-5984**Note:**

- 1) To do an undergraduate degree in Oceanography one must undertake a combined Honours with another Science.
- 2) Graduate students may select courses from the following areas of specialization: physical oceanography and meteorology; biological oceanography; chemical oceanography; geological and geophysical oceanography.

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Algal physiology
- Aquatic ecology
- Biological oceanography (introduction)
- Dynamic oceanography (introduction)
- Elements of dynamic oceanography
- Estuaries
- History of the ocean basins
- Man and the oceans
- Marine chemistry and geochemistry (introduction)
- Marine microbiology
- Marine pollution
- Oceanographic methods
- Oceanographic research
- Oceanography (introduction)
- Waves and tides

- Biological oceanographic mechanisms
- Biological oceanography
- Dynamic meteorology
- Dynamic oceanography
- Inorganic chemical processes in the marine environment
- Marine chemistry
- Marine phytoplankton ecology
- Marine sediments geochemistry
- Oceanographic methods
- Organic chemicals in the marine environments
- Satellite remote sensing: applications to oceanography and meteorology
- Synoptic oceanography
- Turbulence
- Water waves
- Waves in rotating fluids
- Zooplankton ecology

Research Areas

- Anderson, R.J. • Marine chemistry: marine natural products chemistry; phytoplankton toxins and siderophores; nudibranch and sponge metabolites.
- Boudreau, B.P. • Mathematical geochemistry: mass transport and chemical reactions in sediments; sediment/water interactions; geochemical kinetics (local and global).
- Calvert, S.E. • Geochemistry of marine sediments: oceanic and nearshore ferromanganese nodules; phosphorites; trace metal geochemistry and metal organic associations in sediments; sapropels; chemistry of suspended and settling particles in the ocean; stable isotopes in marine sediments.
- Chase, R.L. • Geological: tectonics of continental margins; oceanic basalt systems, seafloor hydrothermal systems.
- Clowes, R.M. • Geophysics: seismic reflection and refraction studies of the earth's crust and upper mantle both at sea and on land; interpretation and relation to geotectonics of the west coast.
- Grill, E.V. • Chemical: heavy metals in marine waters and sediments; marine geochemistry of manganese; absorption processes; hydrothermal deposits.
- Harrison, P.J. • Biological: physiological ecology of marine algae; nutrient uptake and assimilation by phytoplankton and seaweeds; species competition in varying light and nutrient environments; production of extracellular metabolites by phytoplankton.
- Hsieh, W.W. • Physical: numerical ocean modelling; interannual variability of the Pacific Ocean and the biological consequences; coastal physical oceanography; especially coastal trapped waves and fronts; satellite remote sensing.
- Hughes, G.C. • Biological: growth, development, distributional ecology, and taxonomy of saprobic marine fungi, especially lignicolour Ascomycetes and Fungi Imperfecti of the Pacific Basin; biology of parasitic marine fungi, including ultrastructural studies of host-parasite interactions and infection etiologies; biogeography of marine fungi.
- Leblond, P. • Physical: theory of oceanic waves and currents, tides, surface and internal waves, vorticity waves; circulation in coastal areas and estuaries; Arctic oceanography, the influence of sea-ice on waves.

Lewis, A.G. • Chemical and physical factors affecting the distribution of plankton; ecology of plankton.

Parsons, T. • Biological: trophic relationships of marine ecosystems; large scale experimental studies on trophodynamics involving the perturbation of marine food chains through natural and unnatural (pollutant) stress. Oceanographic surveys of coastal waters.

Pedersen, T.F. • Marine geochemistry: interstitial water chemistry; trace metal diagenesis in oxic and anoxic systems; mine tailings diagenesis; geochemistry applied to palaeoceanography; stable isotope geochemistry.

Pond, S. • Physical oceanography: coastal circulation, dynamics and mixing, turbulence.

Taylor, F.J.R. • Marine phytoplankton, particularly dinoflagellates, as organisms.

Remote Sensing Council

P.A. Murtha, *Chairman* (604) 228-6452/3482

The Council coordinates studies in remote sensing leading to Master's or Ph.D degrees in Oceanography. Specialized programs of study and research can be developed to suit the student's interests and range from theoretical developments of remote sensing technology (including image analysis and sensor development) to specialized applications (such as oceanographic studies). Programs are developed in collaboration with the appropriate departments.

Degrees M.Sc/Ph.D

Resource Management Science Committee

L.M. Lovkulich, *Chairman* (604) 228-5924

This Committee advises interdisciplinary graduate students of options in renewable resource management (including marine resources), coordinates and supervises their programs, and initiates graduate teaching and research in this area as appropriate. Generally, specific courses are offered by the appropriate departments.

Degrees M.Sc/Ph.D

Department of Zoology

Advisor, Fish Biology and Aquaculture Program (604) 228-2131

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Animal mechanics and locomotion (introduction)
- Aquatic ecology
- Biological oceanography (introduction)
- Biology of fishes
- Biology of invertebrates
- Marine invertebrate zoology
- Zoogeography
- Advanced ichthyology
- Comparative invertebrate embryology
- Fisheries biology and management
- Marine invertebrate zoology

Research Areas

Blake, R.W. • Hydrodynamics, kinematics and energetics of swimming, leading to the formulation of hydromechanical models which can be used to predict structural design of animals.

Carefoot, T.H. • Comparative nutrition of marine invertebrates, especially herbivorous molluscs feeding on macro-algae; energy partitioning on diets differing in quantitative and qualitative nutritional value; feeding preferences.

Larkin, P.A. • Population ecology, particularly of fish, and particularly in the use of models as a device for representing population processes; interests also in limnology, fisheries management and resource ecology.

Lewis, A.G. • Ecology and physiology of marine zooplankton.

Liley, N.R. • Two aspects of behaviour are currently under study: (1) The analysis of causal factors governing behaviour in fish, with emphasis placed on the role of pheromones and endocrine mechanisms in the regulation of reproductive behaviour. (2) The function and evolution of behaviour, involving an investigation into factors influencing behaviour and polymorphism of natural populations of the guppy, *Poecilia reticulata*, in Trinidad; lab studies aimed at isolating and testing some of the "apparent" correlations between ecological factors and the variation observed in natural populations.

MacPhail, J.D. • Interested in evolutionary biology, particularly in the origin and evolution of isolating mechanisms; also in predation as a selective pressure, particularly in stickleback populations.

Northcote, T.G. • Mechanisms controlling migratory behaviour of fish (freshwater salmonids) and lake plankton; interactive ecology of cohabiting fishes; feeding ecology of stream fishes; impacts of man on inland waters and fish.

Parsons, T.R. • Biological oceanographic studies on processes affecting the food chain in the sea; development of methods and techniques for in situ and experimental studies on planktonic organisms and their environment.

Randall, D.J. • Respiration, circulation and acid/base regulation in fish and amphibia. The evolution of air breathing in vertebrates. The overall objective is to understand the design and evolution of vertebrate respiratory structures.

Wilimovsky, N.J. • Systematics and ecology of fishes. Fishery biology (multispecies harvest and management; data and communication) policy and strategy in resource management.

Kasting, N.W. • Physiology of whales.

The Registrar
University College of Cape Breton
P.O. Box 5300,
Sydney, Nova Scotia, B1P 6L2
Telephone (902) 539-5300
Telex 111

UNIVERSITY COLLEGE OF CAPE BRETON

UCC

Specialized Marine Programs

None

Departments, Institutes

Mathematics and Natural Sciences

Department of **Mathematics and Natural Sciences**

Degrees B.Sc

Courses

- Ecology of natural communities
- Field natural history
- Invertebrate zoology
- Marine ecology
- Principles of aquaculture

Research Areas

Foulds, J.B. • Coastal aquatic invertebrates, ecology of crustaceans, pollution and environmental impact studies of estuarine and marine environments.

Université de Montréal
C.P. 6128, "A",
Montréal, Québec, H3C 3J7
Téléphone (514) 343-6111
Télex 05267389

Programmes spécialisés dans le domaine maritime

Aucun

Départements, Instituts

Géographie

Géologie

Groupe interuniversitaire de recherches

océanographiques du Québec

Sciences Biologiques

Département de **Géographie**

Dr. P.M. Foggin, *Directeur* (514) 343-4115

Degrees B.Sc

Cours

- Géomorphologie littorale
- Géomorphologie structurale

Domaines de recherche

Non disponible

Département de **Géologie**

Dr. B. Mamet, *Directeur* (514) 343-6820

Degrees B.Sc

Cours

- Océanographie
- Principes de géomorphologie

Domaines de recherche

Non disponible

Groupe interuniversitaire de recherches océanographiques du Québec (GIROQ)

Le Groupe est relié au Département de sciences biologiques de l'Université de Montréal, du Département de biologie de l'Université Laval (secretariat du GIROQ), au Département de biologie et à l'Institut d'océanographie de l'Université McGill.

Les domaines de recherche sont l'océanographie biologique, l'océanographie géologique, l'océanographie physique et pêches maritimes.

Département de **Sciences Biologiques**

Dr. R. Carbonneau, *Directeur* (514) 343-6875

Degrees B.Sc/M.Sc/Ph.D

Cours

- Ecologie marine
- Ecosystème
- Ichtyologie
- Invertébrés
- Océanographie
- Phycologie and bryologie
- Stage d'école marine
- Vertébrés
- Poissons: dynamique des populations
- Végétation aquatique et riparienne

Domaines de recherche

Brunel, P. • Benthos, taxonomy et systématique, océanographie biologique, crustacés.

Université de Moncton
Centre Universitaire de Moncton
Moncton, Nouveau-Brunswick, E1A 3E9
Téléphone (506) 858-4000
Télex 014-2653

Université de Moncton
Centre Universitaire de Shippagan
Shippagan, Nouveau-Brunswick, B0B 2P0
Téléphone (506) 336-4761

UNIVERSITÉ DE
MONCTON

UMO

Programmes spécialisés dans le domaine maritime

Études halieutiques (Administration) — Certificat
Gestion des pêches (Administration) — B.G.P.

Départements, Instituts

Administration
Biologie
Droit
Génie civil
Géographie
Groupe interdisciplinaire de recherche dans le Golfe Saint-Laurent
Huntsman Marine Laboratories

Faculté d'Administration

C. LeBlanc, *Directeur*

Note:

- 1) Le Baccalureat en gestion des pêches (BGP) vise à donner au candidat une solide formation en administration et une initiation au monde des pêches, par le biais de cours en économie, marketing, management, finance, comptabilité, mathématiques et des blocs de cours appliqués aux pêches. Il vise à préparer des gérants, chefs de secteurs, fonctionnaires et officiers dans le domaine de la gestion des pêches par séminaires, cours-laboratoires et stage de travaux pratiques. Le programme dure 4 ans: les années 1, 2, 4 sont offerts au Centre Universitaire de Shippagan et l'année 3 est offert au Centre Universitaire de Moncton.
- 2) Un certificat en Études Halieutiques est offert par le Département d'Éducation permanente. Le programme vise à transmettre les principes fondamentaux des différentes disciplines inhérentes aux pêches maritimes.

Niveaux Certificat/BGP

Cours

- Aspects légaux des pêcheries
- Biogéographie de la mer
- Économie des provinces de l'Atlantique
- Éléments de dynamique des stocks exploités
- Éléments des pêcheries
- Finances et relations économiques internationales
- Géographie économique et humaine
- Histoire et sociologie de la coopération
- Infrastructure des usines d'appretage
- Initiation au droit commercial
- Introduction à l'informatique de gestion
- Navigation et engins de pêche
- Practicum en gestion des pêches II
- Séminaire en gestion des pêches
- Socio-économie des pêches
- Traitement des produits marins

Domaines de recherche

Aucun

Département de Biologie

Dr. Y. Poussart, *Directeur*

Niveaux B.Sc./M.Sc

Cours

- Aquiculture
- Biologie marine
- Dynamiques des populations marines exploitées
- Ichthyologie
- Invertébrés
- Océanographie
- Parasitologie
- Phycologie
- Vertébrés
- Botanique
- Ecologie
- Océanographie
- Physiologie végétale et animale
- Populations
- Zoologie

Domaines de recherche

Beninger, P. • Physiologie et biologie des mollusques pétoncles.
Boghen, A. • Aquaculture des crustacés décapodes.
Lakshminarayana, J.S.S. • Productivité primaire en milieu marin; phytoplancton.
Nuckle, J. • Ecologie du milieu terrestre côtier.

Département de Droit

J. Lockyer, *Doyen*

Niveaux LL.B

Cours

- Droit maritimes
- Problèmes juridiques

Domaines de recherche

Aucun

Département de Génie Civil

Dr. N. Srivastava, *Directeur*

Niveaux B.ScA

Cours

- Hydraulique maritime

Domaines de recherche

Aucun

Département de Géographie

Niveaux B.A.

Cours

- Géographie de la mer
- Géographie de la région Atlantique
- Géomorphologie
- Introduction à la géologie

Domaines de recherche

Aucun

Groupe interdisciplinaire de recherche dans le Golfe Saint Laurent (GIRHAG)

Centre Universitaire de Shippagan
Shippagan, Nouveau-Brunswick, E0A 2P0
Directeur, (506) 336-4761

Grâce à un octroi du ministère des Pêches du Nouveau-Brunswick, l'équipe de recherches formée de chercheurs du Centre Universitaire de Shippagan et du Centre Marin vise à développer la recherche fondamentale et appliquée dans le domaine des pêches en plus de travailler sur les projets suivants:

- 1) Étude de la dynamique des pêches côtières et hauturières en les comparant à d'autres modèles de gestion (par ex. norvégien, français).
- 2) Étude de l'environnement littoral de la région Caraquet-Shippagan-Lamèque-Miscou dans le but d'identifier les sites potentiels pour l'aquaculture.
- 3) Expériences sur la culture de diverses espèces, notamment des salmonidés et des poissons plats.
- 4) Élaboration d'une banque informatisée de références bibliographiques sur les pêches commerciales dans le Golfe Saint-Laurent.
- 5) Création d'un centre de documentation régional sur les pêches.

Cette infrastructure de recherche est profitable dans une certaine mesure à la formation universitaire des étudiants inscrits au baccalauréat en gestion des pêches. De plus, les chercheurs de différents organismes scientifiques gouvernementaux et universitaires collaborent aux divers projets du GIRHAG.

Huntsman Marine Laboratories (HML)

Brandy Cove
St. Andrew's, New Brunswick, E0G 2X0
Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

University of New Brunswick, College Mill, Box 4400
Fredericton, New Brunswick, E3B 5A3
Telephone (506) 453-4666
Telex 014-46202

UNIVERSITY OF NEW BRUNSWICK

University of New Brunswick, Tucker Park, Box 5050
Saint John, New Brunswick, E2L 4L5
Telephone (506) 648-5500

Specialized Marine Programs

Aquaculture and Fisheries Biology (Biology) — B.Sc.(Hons)
Hydrographic Surveying (Survey Engineering) — Certificate/B.Sc.E
Marine Biology (Sciences) — B.Sc(Hons)/M.Sc/Ph.D.
Transportation (Civil Engineering) — M.SE/Ph.D
Transportation (Transportation Group) — Diploma

Departments, Institutes

Anthropology
Biology
Chemistry
Civil Engineering
Economics
Huntsman Marine Laboratories
Survey Engineering
Geology
Law
Science
Transportation Group

Department of Anthropology

Department (506) 453-4975

Courses

None

Research Areas

Pool, G.R. • Impact of regulation on small scale fishing industries in the Atlantic Provinces; in particular the salmon and lobster industries.

Department of Biology

Advisor, Aquaculture and
Fisheries Biology Program (506) 453-4582

Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Aquaculture in Canadian perspective
- Concepts in animal physiology
- Endocrinology
- Environmental zoology
- Ethology
- Functions of invertebrate animals
- Fundamentals of aquaculture
- General parasitology
- Ichthyology and fisheries science
- Introduction to marine parasitology
- Laboratory studies in vertebrate physiology
- Marine biology field course
- Marine ecology
- Microbial physiology
- Mycology
- Phycology
- Vertebrate zoology
 - Advanced mycology
 - Advanced parasitology
 - Advances in general microbiology
 - Animal health in aquaculture

- Aquaculture
- Comparative animal physiology
- Fish physiology
- Phycology

Research Areas

Burt, M.D.B. • Biology of lathyhelminths and parasite ecology.
Cowan, F.B.M. • Ultrastructure and osmoregulation, transport epithelia.

Lynch, W.H. • Physiology of aquatic psychrotrophic bacteria.

MacKinnon, B.M. • Reproductive morphology and physiology off parasitic helminths.

McKenzie, J.A. • Ethology and biochemical systematics of fishes.

Taylor, A.R.A. • Marine phycology, biology of seagrasses.

Whitney, N.J. • Mycology, phytopathology.

Wiggs, A.J. • Physiology of poikilothermic vertebrates.

Department of Chemistry

Dr. John A. Findlay (506) 453-4789

Courses

None

Research Areas

Findlay, J.A. • Structure determination of marine natural products; antifungal agents from marine fungi.

Department of Civil Engineering

Advisors: (506) 453-4521

Degrees B.Sc.Eng/M.Sc.Eng/Ph.D.

Courses

- Construction materials
- Foundation engineering
- Structural engineering
- Coastal hydraulics
- Concrete technology
- Deterioration of materials
- Ice engineering
- Marine and shipping policy
- Port and harbour structures
- Port planning
- Transportation policy

Research Areas

Bremner, T.W. • Design of concrete for offshore structures, evaluation of durability of materials for use in marine concrete.

Ircha, M.C. • Port planning and shipping policy.

Department of Economics

Telephone (506) 453-4819/4828

Degrees B.A.(Hons)/M.A.

Courses

- Economics of fisheries management
- Natural resource economics
- Natural resource economics II

Research Areas

Cook, B.A. • Economics of commercial and recreational fisheries management.

McGaw, R. • Economics of fisheries management.

Department of Geology*Advisor:* (506) 453-4804**Note:** Courses marked with * are only offered at the St. John campus.**Degrees** B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Biogeology (systematic paleontology)*
- Carbonate sedimentology and paleoecology
- Field course in carbonate sedimentation and marine ecology
- Geochemistry of natural waters
- Marine carbonates field course, Bermuda*
- Sedimentology III
- Sedimentology*
- Advanced marine clastic sedimentology

Research Areas

Logan, A. • Marine biology, marine ecology, coral reef biology, brachiopod biology.

Noble, P.A. • Paleontology.

Pickerill, K. • Paleontology, sedimentology and ichnology.

van de Poll, H. • Sedimentology.

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

Telephone (506) 529-8895

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An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

Faculty of Law*Faculty* (506) 453-4669**Degrees** L.L.B.**Courses**

- Admiralty law
- Environmental law
- International law and organization
- Natural resources law

Research Areas

Not available

Division of Sciences*Chairman:* (506) 648-5566**Note:** Division of Sciences courses are only offered at the St. John campus.**Degrees** B.Sc(Hons)/M.Sc/Ph.D**Courses**

- Advanced marine field course
- Aquatic production dynamics
- Biology and conservation of marine mammals
- Biology of marine invertebrates
- Crustacean biology
- Fish biology

- Introduction to plant physiology
- Marine biology field course
- Marine botany
- Marine ecology
- Marine field course (Bermuda)
- Marine fisheries
- Oceanography
- Physiology of marine vertebrates
- Phytoplankton biology
- Pollution biology
- Principles of ecology
- Estuarine ecology

Research Areas

Halcrow, K. • Crustacean biology, ultrastructure of crustacean integuments.

Lobban, C.S. • Ecology and physiology of intertidal seaweeds and diatoms.

Logan, A. • Coral reef biology, sub-tidal hard bottom communities, brachiopod biology.

Rawlence, D.J. • Estuarine plankton biology.

Terhune, J.M. • Seal biology, bio-acoustics, biological instrumentation.

Thomas, M.L.H. • Estuarine biology, rocky shore ecology mangrove ecology, oil pollution biology, sub-tidal hard bottom ecology.

Department of Survey Engineering*Advisor:* (506) 453-4698**Note:**

- 1) The B.Sc.E Hydrographic Surveying program option is accredited by the International Hydrographic Organization (IHO) and the International Federation of Surveyors (FIG).
- 2) A one-year certificate program in Hydrographic Surveying is also available that is intended for practicing surveyors or hydrographers with at least two years formal technical training. The certificate program includes the following courses:
 - Advanced adjustment calculus
 - Geodesy
 - Geodetic surveying
 - Hydrographic surveying
 - Introduction to adjustment calculus
 - Linear algebra for surveying engineers

Degrees B.Sc.E/M.Eng/M.Sc.E/Ph.D/Certificate
Courses

- Digital mapping
- Electronic surveying
- Exploration geophysics I
- Exploration geophysics II
- Hydrographic operations
- Hydrographic surveying
- Remote sensing
- Approximation and time series
- Automation in photogrammetry
- Digital image analysis
- Engineering applications of photogrammetry
- Engineering and mining surveying, advanced

- Extraterrestrial positioning
- Functional analysis applied to surveying
- Geodetic surveying, advanced topics in geodynamics
- Hydrographic surveillance, advanced
- Photogrammetry
- Propagation of electromagnetic waves
- Satellite gravimetry
- Spacial studies in geodesy
- Survey law
- Surveying economics and surveying management
- Tensors in geodesy and photogrammetry
- Theory of the figure of the earth

Research Areas

- Chrzanowski, A. • Engineering, mining and geodetic surveys.
 Derenyi, E.E. • Photogrammetry, remote sensing.
 Faig, W. • Photogrammetry, engineering surveying.
 Gloss, G.H. • Urban cartography.
 Hamilton, A.C. • Data management systems.
 Kleusberg, A. • Navigation.
 Langley, R.B. • Geodynamics, extraterrestrial geodetic techniques.
 Masry, S.E. • Digital mapping, automation in photogrammetry, resource mapping systems.
 McLaughlin, J.D. • Cadastral systems, international law.
 Vanicek, P. • Geodesy.
 Wells, D.E. • Marine satellite geodesy.

Transportation Group

P.O. Box 4400
 University of New Brunswick
 Fredericton, New Brunswick, E3B 5A3
 Professor Michael Ircha (506) 453-4521
Note: A one-year undergraduate diploma in Transportation is offered.

Degrees Diploma

Courses

- Port planning
- Ports and shipping policy

Research Areas

Ircha, M.C. • Port planning and shipping policy.

**UNIVERSITY OF
PRINCE EDWARD ISLAND**

Registrar's Office
University of Prince Edward Island
550 University Avenue,
Charlottetown, Prince Edward Island, C1A 4P3
Telephone (902) 566-0608

Specialized Marine Programs

None

Departments, Institutes

Biology

Department of **Biology***Department (902) 566-0301***Degrees** B.Sc(Hons)**Courses**

- Biology of fishes
- Phycology (introductory)
- Marine biology
- Marine algae (advanced)

Research Areas

Hanic, L. • Algae, phytoplankton, phycology.
Johnston, E.J. • Anadromous fishes, aquaculture,
ichthyoplankton, physiology, marine fishes.

Programmes spécialisés dans le domaine maritime

Aucun

Départements, Instituts

Biologie

Département de **Biologie**

J. Gingras, *Directeur* (514) 282-4118

Niveaux B.Sc/M.Sc

Cours

- Ecologie aquatique
- Ichtyologie
- Introduction à l'océanographie
- Mycologie et phycologie
- Zoologie évolutive
- Zoologie évolutive des invertébrés
- Zoologie évolutive des vertébrés

Domaines de recherche

Non disponible

Programmes spécialisés dans le domaine maritime

Affaires maritimes (Économie et Gestion) — Diplôme
Gestion des ressources maritimes (Économie et Gestion) — M.Sc
Océanographie (Océanographie) — M.Sc/Ph.D

Départements, Instituts

Biologie et Sciences de la Santé
Chimie et Physique
Economie et Gestion
INRS - océanologie
Océanographie
Sciences Humaines

Département de **Biologie et Sciences de la Santé**

M. Bourassa, *Directeur du module de Biologie* (418) 724-1611

Niveaux B.Sc

Cours

- Arthropodes
- Biologie marine
- Chordés
- Ichtyologie
- Invertébrés
- Océanologie

Domaines de recherche

Non disponible

Département de **Chimie et Physique**

Yves Paquin, *Directeur du module de Chimie*

— *Physique* (418) 724-1752

Niveaux B.Sc

Cours

- Aspects physiques des océans

Domaines de recherche

Dionne, J. • Physique, mathématique.

Dumais, J.F. • Physique, mathématique.

Karakiewick, B. • Physique, mathématiques.

Département de l'**Economie et Gestion**

J. Rioux, *Directeur* (418) 724-1558

E.Y. Garon, *Directeur des programmes en affaires maritime et gestion des ressources maritime* (418) 724-1576

Note: Le Diplôme en Affaires maritimes est un programme d'études supérieures interdisciplinaire d'un an.

Niveaux B.Sc/Diplôme

Cours

- Analyse économique de projet et études d'impacts
- Analyse systémique des pêches
- Biologique halieutique
- Commercialisation et distribution (marketing)
- Comptabilité et fiscalité
- Décisions et prévisions dans l'industrie des pêches
- Droit international de la mer
- Economie des pêches
- Economie maritime
- Engins et technologie de pêche
- Gestion des entreprises de pêche
- Gestion des opérations des usines de transformation
- Gestion publique du secteur maritime
- Initiation aux affaires maritimes
- Les pêches et le développement économique
- Microéconomie des ressources maritimes
- Nouveaux produits et nouvelles techniques dans la transformation des produits marins
- Océanologie
- Organisation professionnelle des pêches
- Pêche et management public
- Planification des opérations financières d'une entreprise de pêche
- Recherche commerciale et développement de nouveaux produits de la mer
- Séminaires-sujets spéciaux I et II
- Simulation et évaluation des stocks
- Technologie maritime

Domaines de recherche

Non disponible

INRS - Océanologie

Patrick Mayzeau, *Directeur*

L'INRS - Océanologie est l'un des huit centres de recherche fondamentale et orientée qui constituent l'Institut national de la recherche scientifique (INRS), lequel s'intègre à l'Université du Québec comme l'une de ses onze constituantes. L'INRS - Océanologie se préoccupe de l'étude du milieu biologique et biochimique côtier, du milieu physique côtier, et de la recherche halieutique. Apportant sa collaboration au programme d'enseignement en océanographie de l'Université du Québec à Rimouski, l'INRS - Océanologie dispense de cours et dirige des travaux de thèses d'étudiants.

Domaines de la recherche

- Besner, M. • Biologie, biochimie et pêche.
- Drapeau, G. • Géologie, sédimentologie.
- Karakiewick, B. • Physique, mathématiques.
- Long, B. • Géologie, sédimentologie.
- Marsot, P. • Biologie, biochimie, aquaculture et pêche.
- Pelletier, E. • Chimie, géochimie, pollution.

Département d'Océanographie

G. Desrosiers, *Directeur du programme d'Océanographie* (418) 724-1765

Niveaux M.Sc/Ph.D

Cours

- Analyse des séries chronologiques
- Biologie halieutique
- Chimie physique et l'atmosphère
- Cycles biogéochimiques des océans
- Développements récents en océanographie
- Eau de mer: une solution d'électrolytes
- Échantillonnage en océanographie
- Ecologie numérique
- Éléments d'océanographie dynamique
- Engins et techniques de pêche
- Études des boues
- Fronts océaniques et côtiers
- Influences sédimentologiques d'organismes benthiques
- Interaction au mer
- Matière organique naturelle du milieu marin
- Méthodes d'optimisation en océanographie
- Méthodes mathématiques avancées
- Méthodologie d'échantillonnage de la faune benthique
- Modélisation du milieu marin
- Morphologie et sédimentation des zones littorales
- Océanographie biologique
- Océanographie chimique
- Océanographie des estuaires
- Océanographie dynamique
- Océanographie expérimentale
- Océanographie géologique
- Océanographie synoptique
- Ondes océaniques
- Pollution
- Principes de synécologie benthique
- Principes et processus géochimiques de la diagenèse primaire

- Problèmes en océanographie physique
- Processus sédimentologiques côtiers
- Sédimentologie des boues
- Turbulence
- Zooplancton marin

Domaines de recherche

- Arnac, M. • Chimie, géochimie.
- Besner, M. • Biologie, biochimie et pêche.
- Brindle, J.R. • Chimie, géochimie.
- Chanut, J.P. • Océanographie côtière, processus côtiers et littoraux, écologie marin, biostatistiques.
- Côté, B. • Biologie, biochimie, et pêche.
- Desrosiers, G. • Benthos, invertébrés, études des populations, océanographie biologiques, milieu marin.
- Dubé, F. • Biologie, biochimie
- Dufresne, L. • Biologie, biochimie, et pêche
- Drapeau, G. • Géologie, sédimentologie.
- El-Sabh, M.I. • Océanographie côtière, physique, synoptique; circulation océanique, océanographie halieutique.
- Gratton, Y. • Océanographie physique, ondes, dynamique des fluides, océanographie côtière.
- Khalil, M. • Océanographie chimique, chimie organique, toxicologie, pollution, milieu marin.
- Lebel, J. • Chimie analytique, géochimie, interface sédiment-eau, océanographie chimique et côtière, qualité environnementale.
- Long, B. • Géologie, sédimentologie.
- Marinier, B. • Chimie, géochimie.
- Marsot, P. • Biologie, biochimie aquaculture et pêche.
- Maurviel, A. • Géologie, sédimentologie.
- Paquin, Y. • Océanographie chimique, géochimie, chimie analytique, milieu marin.
- Pelletier, E. • Chimie, géochimie, pollution.
- Silverberg, N. • Interface sédiment-eau, océanographie chimique, océanographie côtière.
- Vincent, B. • Benthos, études des populations, mollusques.

Département de Sciences Humaines

G. Brien, *Directeur* (418) 724-1636

Niveaux B.Sc

Cours

- Géographie de la mer
- Géographie de la pêche
- Géographie physique des océans
- Géomorphologie
- Géomorphologie littorale et marine

Domaines de recherche

Non disponible

Programmes spécialisés dans le domaine maritime

Aucun

Départements, Instituts

Biologie

Géographie

Département de **Biologie**

Département (819) 376-5053

Niveaux B.Sc

Cours

- Aménagement piscicole
- Biologie marine
- Eléments de zoologie
- Ichtyologie
- Méthodologie en environnement
- Zoologie des invertébrés
- Zoologie des vertébrés

Domaines de recherche

Non disponible

Département de **Géographie,**J. Cermakæen, *Directeur* (819) 376-5099

Niveaux B.Sc

Cours

- L'homme et l'espace maritime

Domaines de recherche

Non disponible

Specialized Marine Programs

None

Departments, Institutes

Biology
Geological Sciences

Department of **Biology**

J. King, *Chairman* (306) 966-4399

Degrees B.Sc(Hons)

Courses

- Ecosystems
- Aquatic biology
- Ichthyology
- Aquatic insects

Research Areas

Gilmour, T.H. • Invertebrates, molluscs, nutrition, physiology, marine environments.

Lacalli, T.C. • Invertebrates, zooplankton, marine environments.

Smith, R.J.F. • Marine fishes, toxicology, environmental quality.

Department of **Geological Sciences**

W. Barr, *Chairman* (306) 966-5683

Degrees B.Sc(Hons)

Courses

- Oceanic and atmospheric systems

Research Areas

None

**UNIVERSITY OF
TORONTO (ERINDALE)**

University of Toronto (Erindale)
Mississauga Road,
Mississauga, Ontario, L5L 1C6
Telephone (416) 828-5399

Specialized Marine Programs

None

Departments, Institutes

Biology
Geography
Huntsman Marine Laboratories
Survey Science

Department of **Biology**

Dr. F. Sceicz, *Advisor* (416) 828-5366

Degrees B.A./B.Sc

Courses

- Arctic ecosystems
- Invertebrate zoology
- Marine biology
- Vertebrate evolution
- Vertebrate form and function

Research Areas

Svoboda, J. • Low-level radioactivity in northern environments.
Baker, R.L. • Behavioural ecology of aquatic invertebrates.
Sprules, W.G. • Pelagic plankton communities; adaptation of marine production models to freshwater ecosystems.

Department of **Geography**

Dr. S. Luk, *Chairman* (416) 828-5299

Degrees B.A./B.Sc

Courses

- Transportation and the seas

Research Areas

None

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

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Department of **Survey Science**

Dr. G. Gracie, *Chairman* (416) 828-5298

Degrees B.Sc

Courses

- Hydrographic surveying
- Law of the sea
- Mapping and charting

Research Areas

Kapoor, D.C. • Offshore positioning, international boundaries, chart automation and cartography.

Specialized Marine Programs

None

Departments, Institutes

Botany
Economics
Geography
Geology
Huntsman Marine Laboratories
Law
Zoology

Department of Botany

Dr. P. Sarkar, *Undergraduate Secretary* (416) 978-2035

Dr. V.J. Higgins, *Graduate Co-ordinator* (416) 978-4938

Degrees B.Sc/M.Sc/Ph.D

Courses

- Applied ecology
- Arctic ecosystems
- Marine biology
- Phycology
- Physiology and ecology of algae

Research Areas

Stokes, P.M. • Metal and acid effects on aquatic biota.
Hellebust, J.A. • Heterotrophy and biochemical aspects of osmoregulation in algal cells; membrane transport.

Department of Economics

Dr. D.N. Dewees, *Associate Chairman* (416) 978-5441

Degrees B.A./B.Comm

Courses

- Canadian economic problems
- Energy and resource economics
- Regional economics

Research Areas

None

Department of Geography

Dr. A. Davis, *Undergraduate Secretary*

Degrees B.A./B.Sc.

Courses

- Atmospheric ocean modelling
- Climate modelling
- Geomorphology

Research Areas

None

Department of Geology

Dr. R. Ludvigsen, *Undergraduate Secretary* (416) 978-4970

Dr. A.J. Naldrett, *Graduate Coordinator* (416) 978-3048

Degrees B.A./B.Sc/M.Sc/M.A.Sc/Ph.D

Courses

- Geophysical basis of global tectonics
- Glacial and periglacial geology
- Petroleum geology
- Plate tectonics and global geology
- Principles of physical geology
- Sedimentology of clastic rocks
- Sedimentology of hydrocarbons and mineral deposits in clastic rocks
- Ecology and paleoecology of modern and ancient tropical reefs
- Marine micropaleoecology
- Modern carbonate environments
- Sedimentary basin analysis

Research Areas

Kobluk, D.R. • Reef geology, ecology and paleoecology.

Miall, A.D. • Basin analysis; glaciomarine sedimentation.

Scott, S.D. • Sulfide ores in volcanic and sedimentary rocks; hydrothermal processes and sulfide deposits of the ocean floor.

Spooner, E.T.C. • Sequence, structure, petrology and geochemistry of ophiolitic rocks as a guide to processes which occur at spreading oceanic ridges; consequences of hydrothermal convection of sea-water within spreading ridges.

Wilson, J.T. • Plate tectonics with special reference to the life cycle of ocean basins and possible existence of plumes rising in the mantle.

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Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

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Faculty of LawR.S. Prichard, *Dean* (416) 978-3718J.L. Lax, *Admissions Director* (416) 978-4908**Degrees** LL.B/LL.M/SJD**Courses**

- Admiralty law
- Environmental control
- International commercial law
- International sales and sales financing
- International trade regulation
- Law and practice of international trade

Research Areas

None

Department of ZoologyDr. T.S. Parsons, *Undergraduate Secretary* (416) 978-4863Dr. S.S. Tobe, *Graduate Associate Chairman* (416) 978-3477**Degrees** B.Sc/M.Sc/Ph.D**Courses**

- Aquatic macrosystems
- Field ornithology
- Ichthyology
- Invertebrate zoology
- Neuroendocrinology of invertebrates
- Parasites and parasitism
- Phylogenetics
- Protozoology
- Vertebrate mechanics

Research Areas

Crossman, E.J. • Biology and systematics of fishes.

Mrosovsky, N. • Sea turtles.

Regier, H.A. • Aquatic ecosystem degradation.

Telford, G.M. • Biomechanics and functional morphology in terms of environmental forces and behavioural requirements.

Winterbottom, R. • Indo-Pacific coral reef fish phylogeny and biogeography.

University of Toronto (Scarborough)
1265 Military Trail,
Scarborough, Ontario, M1C 1A4
Telephone (416) 284-3127

UNIVERSITY OF TORONTO (SCARBOROUGH)

Specialized Marine Programs

None

Departments, Institutes

Biological Sciences
Geography
Geology
Huntsman Marine Laboratories

Department of Biological Sciences

Dr. R. Boonstra, *Discipline Advisor* (416) 284-3221

Degrees B.A./B.Sc

Courses

- Environmental biology of fish populations
- Invertebrate neurobiology
- Marine biology; habitats and communities
- Marine biology; nutrients and productivity
- Physiology of algae
- The arthropoda

Research Areas

Nalewajko, C. • Bacterial-phytoplankton interactions in the Arctic Ocean.

Govind, C.K. • Life history of lobster nerves and muscles.

Weatherby, A.H. • Studies of fish growth; development of telemetry apparatus to measure metabolic costs of fish field activity.

Department of Geography

Dr. A.M. Sawchuk, *Supervisor of Studies* (416) 284-3130

Degrees B.A./B.Sc

Courses

- Coastal geomorphology
- General geomorphology
- Introduction to physical geography
- Resource management

Research Areas

Greenwood, B. • Nearshore hydrodynamics and sediment transport; morphodynamics of barred and planar nearshore slopes; bedforms and bedding genesis under wave-current regimes; numerical models of coastal sediment transport; sediment parameters and paleoenvironmental reconstruction.

Department of Geology

Dr. J. Westgate, *Discipline Advisor* (416) 284-3336

Degrees B.Sc

Courses

- Glacial and periglacial geology
- Ice ages and human ecology

Research Areas

Eyles, N. • Glaciomarine sedimentation.

Westgate, J. • Tephrochronology; quaternary geology.

Huntsman Marine Laboratories (HML)

Brandy Cove

St. Andrew's, New Brunswick, E0G 2X0

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Specialized Marine Programs

None

Departments, InstitutesGeography
Geology
LawDepartment of **Geography**Dr. I. Stebelsley, *Head* (519) 253-2171**Degrees** B.A./B.Sc(Hons)/MA**Courses**

- Geomorphology
- Coastal geomorphology
- Coastal zone resource management

Research Areas

None

Department of **Geology**Dr. F. Simpson, *Head***Degrees** B.Sc(Hons)**Courses**

- Introduction to earth dynamics
- Introduction to oceanography

Research Areas

None

Department of **Law**Prof. N. Gold, *Dean***Degrees** LL.B.**Courses**

- Shipping and admiralty law

Research Areas

None

Specialized Marine Programs

None

Departments, Institutes

Huntsman Marine Laboratories
Zoology

Huntsman Marine Laboratories (HML)

Brandy Cove
St. Andrew's, New Brunswick, E0G 2X0
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Department of **Zoology**

D.M. Ogilvie, *Chairman* (519) 661-3155

Degrees B.Sc(Hons)/M.Sc

Courses

- Applied ecology
- Invertebrates
- Vertebrates
- Aquatic ecosystems pollution and productivity
- Experimental marine biology

Research Areas

Green, R.H. • Ecology of freshwater and marine benthic communities.

Keenleyside, M.H.A. • Reproductive behaviour in fishes.

Ogilvie, D.M. • Behavioural and physiological effects of ecotoxicants.

University of Victoria
Box 1700,
Victoria, British Columbia, V8W 2Y2
Telephone (604) 721-7211
Telex 049-7222

Specialized Marine Programs

Marine Biology (Biology) — B.Sc/M.Sc/Ph.D
Marine Science (Bamfield Marine Station) — B.Sc/M.Sc/Ph.D

Departments, Institutes

Bamfield Marine Station
Biology
Engineering
Geography
Law

Bamfield Marine Station

(See under Bamfield Marine Station in Annex)

Department of Biology

Dr. J.E. McInerney, *Chairman* (604) 721-7094

Degrees B.Sc/M.Sc/Ph.D

Courses

- Aquaculture
- Biology of marine intertidal organisms
- Chemical and biological oceanography
- Elements of oceanography
- Ichthyology
- Marine and freshwater phycology
- Marine benthos biology
- Marine field biology
- Marine plankton biology
- Nonvascular plants
- Physical and geological oceanography
- Benthos ecology
- Ichthyology
- Invertebrate anatomy and embryology
- Marine algae
- Marine animal physiology
- Phytoplankton ecology
- Vertebrate anatomy and embryology
- Zooplankton ecology

Research Areas

- Austin, A.P. • Marine and freshwater phycology and ecology; environmental impact assessment.
- Brinkhurst, R.O. • Marine benthic zoology; ecology of freshwater and marine Oligochaeta.
- Burke, R.D. • Developmental biology, histology, embryology of marine invertebrates, metamorphosis.
- Ellis, D.V. • Marine ecology; sediment benthos; environmental impact assessment.
- Fontaine, A.R. • Functional morphology of marine invertebrates; echinoderms.
- Gregory, P.T. • Population ecology of reptiles and amphibians.
- Hobson, L.A. • Biological oceanography; phytoplankton ecology and physiology.
- Littlepage, J.L. • Biological oceanography; zooplankton physiology and ecology.

- McInerney, J.E. • Behaviour and physiology of fishes.
- Paul, M. • Developmental biology; marine invertebrate embryology.
- Reid, G.B. • Physiology of marine invertebrates.
- Tunncliffe, J. • Marine benthic ecology and community structure.

Department of Engineering

Dr. A. Antoniou, *Chairman* (604) 721-8610

Degrees M.Eng/M.A.Sc/Ph.D

Courses

- Underwater acoustic systems

Research Areas

Zielinski, A. • Underwater acoustic systems; ocean electronic instrumentation; signal acquisition and processing.

Department of Geography

Dr. C.J.B. Wood, *Chairman* (604) 721-7327

Degrees B.A./B.Sc/M.A./Ph.D

Courses

- Coastal resource analysis
- Geomorphology
- Marine resource analysis
- Coastal and marine resource management

Research Areas

- Forward, C.N. • Port functions.
- Foster, H.D. • Applied geomorphology.
- Ross, W.H. • Coastal management, fisheries.
- Van der Flier-Keller, E. • Geomorphology.

Department of Law

W.A.W. Neilson, *Dean* (604) 721-8150

Degrees LL.B

Courses

- Coastal and marine law

Research Areas

None

Specialized Marine Programs

None

Departments, Institutes

Biology
Geography
Huntsman Marine Laboratories

Department of **Biology**

R.G.H. Downer, *Chairman*
W.B. Kendrick, *Graduate Studies*
Degrees B.Sc(Hons)/M.Sc/Ph.D

Courses

- Arthropod zoology
- Biotechnology
- Fisheries biology
- Invertebrates
- Marine biology
- Microbial ecology
- Phycology
- Population ecology
- Vertebrates
- Fisheries biology
- Parasitology
- Phycology

Research Areas

Power, G. • Anadromous fishes, marine environments.

Department of **Geography**

W.B. Mitchell, *Chairman*
Degrees B.E.S.(Hons)

Courses

- Geomorphology
- Park management
- Remote sensing
- The seas and man's effect upon them

Research Areas

None

Huntsman Marine Laboratories (HML)

Brandy Cove
St. Andrew's, New Brunswick, E0G 2X0
Telephone (506) 529-8895

The Huntsman Marine Laboratories (HML) is a non-profit consortium of 14 universities, 2 government departments and several supporting institutions. HML provides marine field research and teaching facilities for researchers, students and educators.

An Aquaculture Technician Training Program is operated jointly with the New Brunswick Community College and Employment and Immigration Canada.

University of Winnipeg
515 Portage Avenue,
Winnipeg, Manitoba, R3B 2E9
Telephone (204) 786-7811
Telex 07-55540

Specialized Marine Programs

None

Departments, Institutes

Biology
Geography

Department of Biology

Dr. R.A. Woods, *Chairman*

Degrees B.A./B.Sc

Courses

- Comparative chordate zoology
- Ichthyology
- Microbial ecology
- Phycology
- Zoology of higher invertebrates

Research Areas

None

Department of Geography

Dr. G.A.J. Scott, *Chairman*

Degrees B.A./B.Sc

Courses

- Geomorphology
- Marine geography

Research Areas

None

Specialized Marine Programs

None

Departments, Institutes

Biology
Huntsman Marine Laboratories

Department of **Biology**

Dr. E. Kott, *Chairman*

Degrees B.A.(Hons)/B.Sc(Hons)

Courses

- Chordates
- Marine biology
- Fish biology
- Invertebrates

Research Areas

None

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ANNEX/
ANNEXE

Notes:

- 1) *Bamfield Marine Station is operated as a research and teaching facility in marine science by the Western Canadian Universities Marine Biological Society. Instructors are generally drawn from staff of the participating universities: University of Alberta, University of British Columbia, University of Calgary, University of Victoria and Simon Fraser University.*
- 2) *Courses offered in the Spring and Summer as part of the Universities' Honours B.Sc. programmes last 6 weeks (including 4 days travelling time) with an average of 50 hours weekly of lectures, labs, tutorials and field trips.*
- 3) *An integrated programme of courses in Marine Biology is offered irregularly in the Fall. This programme requires residence at the Marine Station for an entire Fall term.*
- 4) *Short (one-week) intensive courses are offered each year for graduate students interested in Marine Biology. Topics vary from year to year.*
- 5) *The research facilities are operated year-round and are open to independent researchers, staff of participating universities and to graduate students.*
- 6) *Degrees are offered by the participating universities and not by the Marine Station itself. Interested students must apply for admission to the appropriate faculty in one of the participating universities.*

Courses

- Biology of fishes
- Biology of marine birds
- Biology of marine mammals
- Biology of marine molluscs
- Comparative embryology
- Comparative ethology
- Directed studies
- Introduction to biological oceanography
- Larval biology
- Mariculture
- Marine ecology
- Marine invertebrate zoology
- Marine phycology
- Oceanography
- Special topics in marine biology
- Toxicology / pharmacology

Research Areas

marine plants: systematics, distribution, ecology, physiology and resource utilization (reproductive biology, genetic selection, nutrient dynamics, growth optimization, harvesting strategy and impacts).

invertebrate zoology: ecology, systematics, physiology, larval biology, biomechanics and biochemistry.

physiology: electrophysiology of cnidarians and sponges, respiratory and circulatory physiology of vertebrates and invertebrates.

comparative endocrinology: particularly of primitive vertebrates (eg. ratfish and hagfish).

fish: ecology, behaviour, physiology and population biology.

marine birds and mammals: ecology and feeding behaviour.

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The *Directory* will guide interested individuals and organizations to the ongoing marine-related education and training available within Canada. This first edition lists the marine-related programmes, courses, and associated research specializations of 72 Canadian universities, colleges, technical schools, and government departments.

Le *Répertoire* peut renseigner les personnes et les organismes intéressés sur l'ensemble des programmes d'études et de formation offerts au Canada dans le domaine des affaires maritimes. Cette première édition fournit la liste des programmes, des cours et des spécialisations en recherche de 72 universités, collèges, écoles techniques et ministères.

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CANADA