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**ACCREDITATION OF THE CAT. B HYDROGRAPHY
PROGRAM IN BELGIUM**







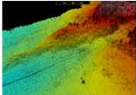



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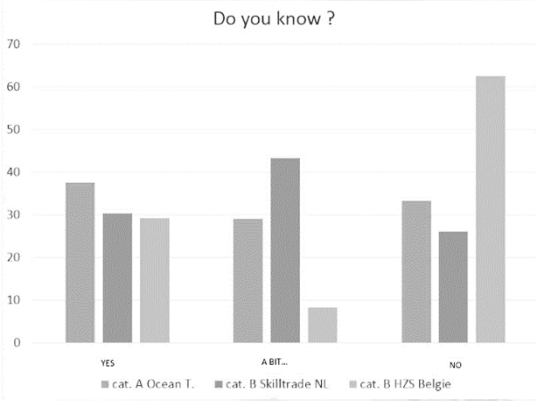







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Hydrographic Education in the Benelux



- A "IHO cat. A hydrography" offered by the "Maritime Institute Willem Barentsz" (Terschelling, the Netherlands);
- A "IHO cat. B hydrography" offered by the private company "Skilltrade" (the Netherlands);
- A "IHO cat. B hydrography" offered by the "Antwerp Maritime Academy (Antwerpen, Belgium), together with Ghent University.

Do you know ?



Response	cat. A Ocean T.	cat. B Skilltrade NL	cat. B HZS Belgie
YES	38	30	29
A BIT...	29	43	8
NO	33	26	62

FIG 

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Why hydrographic education in Belgium ?

- Before 2012 there was no hydrographic education in Belgium. Most Belgian surveyors are engineers or land surveyors ("Master of Science in Geomatics and Surveying", "Master of Science in Land Survey Engineering Technology"...) without IHO cat.A/cat.B accreditation.
- Usually these surveyors received an additional "on the field" training by their employers (mainly 2 big dredging companies).
- For the moment there are approximately 400 surveyors working in Belgium without IHO accreditation.



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History of the establishment of the Belgian cat. B programme

- In 2012, a partnership was formed between:
- The "Institute for Hydrography" was established within the "Antwerp Maritime Academy" (ISO 9001-2008 certified and reviewed by internal and external audits (by "Det Norske Veritas"), as hosting institute of the programme.
- Ghent University (> 35.000 students, > 6.000 staff).
- And...



Antwerp Maritime Academy

INSTITUTE FOR HYDROGRAPHY



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Multiple Private companies and governmental organisations for the practical training:

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The Hydrography B postgraduate (as accredited by the IHO in april 2013) has a duration of one calendar year (end september – end june).

Semester 1						
Module 1 3 weeks	Fieldwork 1 6 weeks	Module 2 3 weeks	Study Time 2 weeks	Examinations & permanent Evaluation 2 weeks		
Semester 2						
Module 3 3 weeks	Fieldwork 2 6 weeks	Module 4 3 weeks	Fieldwork 3 4 weeks	Integrated Fieldwork 4 weeks	Study Time And revision week 3 weeks	Examinations & Permanent Evaluation 2 weeks
Summer						
Summer recession				Examinations (rest) & Permanent Evaluation 2 weeks		
Certificate B						

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Courses

- It has a total of 60 ECTS. (European credit transfer system).
- 36 ECTS are for theoretical courses. 15 ECTS are given at the Antwerp Maritime Academy, 21 ECTS at Ghent University.
- The lecturers of the courses are all specialised in their field and affiliated to the Antwerp Maritime Academy, Ghent University, Flanders Hydraulic Research, the Flemish Hydrographic Office and the industry at large.
- 24 ECTS are for practical training, subdivided in
 - INTEGRATED FIELD WORK (3 weeks)
 - FIELD TRAINING (variable, cfr, field training book)



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Theoretical Classes



	Course Title	ECTS	Class Hours	Location
1	ICT	3	24	UGent
2	Navigation	6	48	HZS
3	Safety	3	24	HZS
4	Seamanship	3	24	HZS
5	Tides and Currents	3	24	HZS
6	Hydrographic Surveying	6	48	UGent
7	Geodesy and Cartography	3	24	UGent
8	Data Management	3	24	UGent
9	Geology and Geophysics	3	24	UGent
10	Legal Aspects	3	24	UGent
	TOTAL THEORETICAL CLASSES	36	288	



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Curriculum Theory (1/2)

Information and Communication Technology	24h	Navigation	48h	Seamanship	24h
Basics	12	Charts	6	Ship Construction	8
Computer hardware	2	Chart datums	1	Stability	8
Software development procedures	5	Nautical charts + ECDIS	3	Ropes and Wires	8
Internet and intranet communications	5	Aids to navigation: buoys, beacons, publications, notices to mariners	2	Safety	24h
Software analysis	12	COLREG	12	GMDSS	8
Architecture operating systems and functions	6	Rules of the Road	9	VHF, SSB, wireless telephone, satellite communications	4
Database structure	6	Case studies	3	Navigational warnings	2
Tides and Currents	24h	Instruments	8	EPIRB	1
Theoretic and dynamic tidal principles	4	Compasses	3	VTS	1
Tidal measurements	4	Radar and ARPA	3	Safety	16
Non-tidal variations	6	Sextant	1	Fire extinguishing tools and systems	3
Tidal streams and currents	4	Errors	1	Survival suits	4
Admiralty tide tables and their use	6	Manoeuvring	5	Small boats, lifeboats and life rafts	3
		Manoeuvres	3	Fire and boat drills	2
		Anchoring	3	Safety procedures (ISM)	4
		Towing	3		
		Navigation	5		
		Coordinate systems	3		
		Positioning (fixes by pelorus and sextant)	1		
		Pilotage	1		
		Meteorology and Oceanography	12		
		Meteorology	6		
		Oceanography	6		



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Curriculum Theory (2/2)

Geodesy and Cartographic Systems	24h	Hydrographic Surveying	48h	Data Management	24h
Principles of geodesy	6	Positioning	10	Analogue data capture	4
Geodetic computations	4	Horizontal and vertical positioning fundamentals	4	Management, processing and analysis of spatial data	8
Approximation and estimation	3	Errors	1	Data presentation	8
Grids and graticules	3	Deployment	1	Nautical charting and production	4
Transformation methodology	4	Elevation measurements and computations	2	Geology and Geophysics	24h
Theory of map projections	2	Heave	1	Marine Geology	8
Three dimensional geodesy	2	Orientation	1	Earth's magnetic field	3
Legal Aspects	24h	Bathymetry	14	Earth's internal structure	1
Product Liability	5	Acoustic positioning concepts	4	Seismic profiling	3
Law of the Sea	13	Underwater acoustics	4	Geotechnical sampling	3
Case studies	6	Non-acoustic bathymetric techniques	2	Deposition and erosion	2
		Interferometry	2	Environmental impact	4
		Hydrographic Instruments	24		
		Horizontal and vertical positioning	6		
		Single-beam echo sounders	2		
		Side scan systems	2		
		Multibeam echo sounders	2		
		RCV	1		
		Real-time data acquisition and control	4		
		Management, processing and analysis of acquired data	3		
		Satellite systems	2		
		Sextant and theodolite used for bathymetric data acquisition	1		
		Errors	1		





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Integrated Fieldwork: 3 weeks

(Integrated) Fieldwork	696 h
Practical Exercises	120
Theoretical Fundamentals practised Routing Data Telemetry links Workshops Seminars & Conferences Visits to manufacturers of hydrographic material/ instruments Practical exercises and projects	

- Integrated 3 weeks of intensive training and excursions
 - Hydrographic survey
 - Dredging simulation
 - Visit to Flanders Hydraulics
 - Fieldwork
 - GIS training
 - Software training
 - Basic safety
- Takes place in May, after theoretical classes
- Training initiated by professors IVH
- Assessment by professors IVH
- Assignments also include preparation and simulation fieldwork project as described in the S-5



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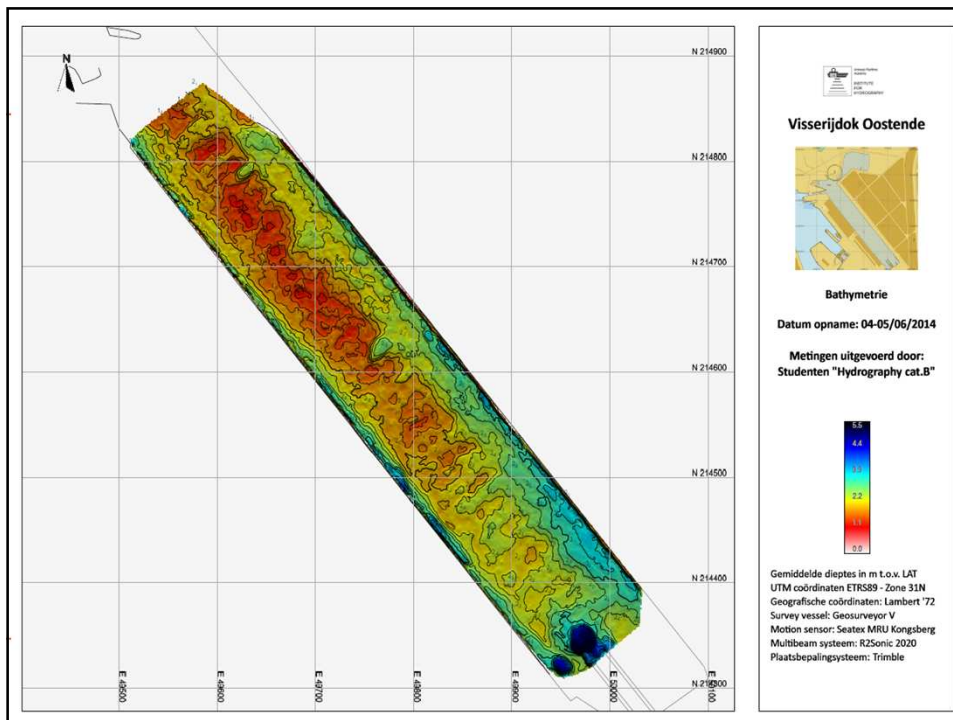
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Integrated Fieldwork: 3 weeks

- One week bathymetric acquisition in Ostend.
- In cooperation with: GeoXYZ, Jan De Nul and Deme.










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Integrated Fieldwork: other 2 weeks

- Processing and map production
- Visit and exercises on dredging simulator
- Training on full mission Bridge simulator
- Maneuvring excercises
- GIS training
- Visit to Flanders hydraulics



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Field training

- **In different private companies**
 - Deme nv
 - Eurosense nv
 - Fugro Survey
 - GEOxyz
 - G-tec
 - IMDC (International Marine & Dredging Consultants)
 - Jan De Nul nv
 - ...



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Evaluation of Field Training

By "Training Record Book"

- Fieldwork is essential for hands-on experience
- Alternating theory + fieldwork: interactive learning procedure gradually learning process
- Fieldwork in a company: practising 'real' work in the field
- Proper guidance due to training record book issuing all items to be performed as per IHO standards

HYDROGRAPHY



Training Record Book





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Functions of Training Record Book

Assessment

Fieldwork supervisors can accurately assess skills, competences, and assignments

Clear Guidelines

Students have guidelines of what to do during their fieldwork in the training record book.

Evaluation

Examination committee has proof of student's practice during fieldwork.

Portfolio

Comprehensive portfolio to use during training and professional career.



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Contents of Training Record Book

- Introduction
- Section 1 Guide to Completion
- Section 2 Summary Record of Progress
 Particulars of Trainee
 Training Programme
- Section 3 Review of Training Progress
 By supervisor
 By chief supervisor
- Section 4 Task Summary Chart
 Record of Fieldwork Periods (Diary)
- Section 5 List of Training Tasks and Competences Achieved
 Survey skill level: Technical knowledge
- Section 6 Projects
- Section 7 Events List
- Section 8 List of Publications



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Assessment of field training

Example from the 'List of Training Tasks and Competences Achieved'

E1 Competence: BATHYMETRY			Examination board Sign/ Date	
Task	Supervisor's Initials/ Date	Evaluation/ remarks by supervisor		
E1.1 Underwater Acoustics				
.1 Calculate sound speed from measurements of temperature, pressure and salinity				
.2 Create a sound profile of the water column using appropriate software (Indicate software on the working sheet)				
.3 Use the echo sounder and apply corrections (mention type of instrument)				
.4 Gather information about the seafloor and interpret the effects				
.5 Identify the sources of noise in the environment and use this information in your measurements				
.6 Operate transponders, pingers, acoustic releases and sound speed meters. Make a report mentioning product identification and findings.				
E1.2 Single-Beam Echo sounders				
.1 Verify the mounting of transducers (hull, towed, over the side and boom)				
.2 List the transducer characteristics that affect beam width				



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Open to International Cooperation: e.g. Vassiviere project

- In 2012 and 2013 there was the possibility for the students to participate in an "European Union Erasmus Intensive Program" which aimed at providing intensive courses jointly proposed by european universities, **ENSTA Bretagne (France)**, Ghent University (Belgium) and **HCU University (Germany)**, and the CIDCO (Interdisciplinary Centre for the Development of Ocean Mapping) (Canada) and at organizing a hydrographic and topographic surveying camp.
- This project took place at the "Lake of Vassivière", one of France's largest artificial lakes exploited by EDF, France's global energy company and was coordinated by Prof. Nicolas Seube (ENSTA).



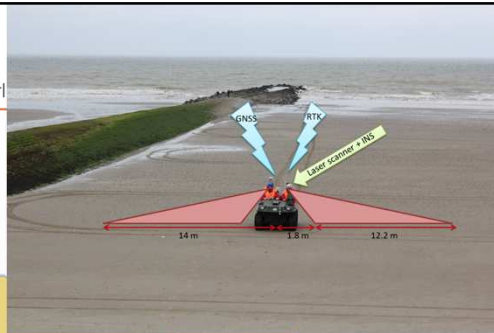
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Vassiviere project



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Entry Requirements

The programme is a postgraduate: students need to have a Bachelor degree or equivalent with:

- A good knowledge of mathematics
- A good knowledge of physics
- A good knowledge of English

Start point = an Application portfolio should be filled in by the applicant.

Submission deadlines

- EU applicants: before end of July
- Non-EU applicants: before end of June



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Entry Requirements

- **Application Portfolio**
 - Programme selection: part-time or full-time
 - Personal/ contact details
 - Linguistic abilities
 - Educational history
 - Employment history (if applicable)
 - Application assessment (based on the Cross Reference Table B) to be completed



APPLICATION PORTFOLIO

Postgraduate Programme
Hydrography B

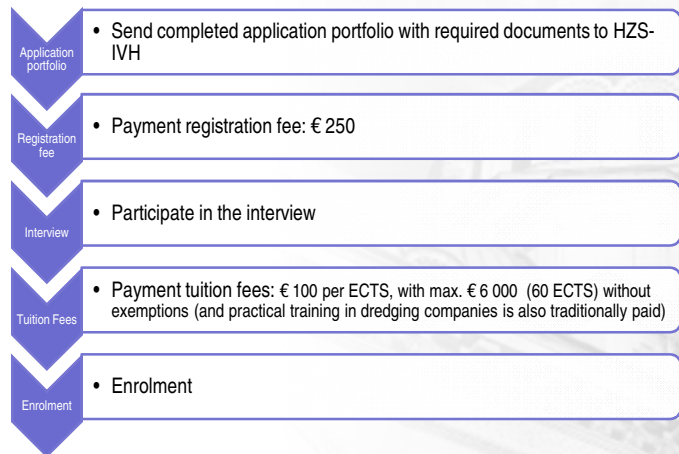
Please complete all sections of this portfolio documented with papers of proof as requested and return to:

Antwerp Maritime Academy - IVH
Nourbaaslei Oude 6
B-2020 Antwerp
Belgium

Deadline for receipt: EU/ EEA 31 July 2013
non-EU 30 June 2013



Entry Procedure



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Entry Requirements

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/15-16_Entry_requirements_WEB.pdf

The application portfolio must be accompanied by the following documents:

- Legalized copy of diploma(s)/ certificates

A copy of diploma and/ or certificates have to be included. When the diploma is in another language than English, Dutch or French, a translation signed by a sworn translator and legalized should accompany the copy of the originals.

Note: non-EU residents need to have their documents legalized at the Belgian Embassy in their respective country.

- Academic transcript

A complete list of courses with results has to be presented. In this list, Mathematics and Physics has to be incorporated.

- An official certificate proving the English language proficiency

Any of the following qualifications (at least one) will meet the English language requirement for entry:

Native English speaker; citizenship of a country where the first language is English

A first degree from an English language programme from a European university or college

A first degree from an overseas institution recognized by the HZS-IVH

A TOEFL (Test of English as a Foreign Language, www.toefl.org) – minimum score of 550 for PBT or 213 for CBT

The British Council IELTS (International English Language Testing Service, www.ielts.org) with a minimum score of 6.5

A satisfactory standard in the verbal section of the Princeton Test (GMAT, Graduate Management Admission Test, www.gmat.org)

Alternative proof of English proficiency for European citizens.

- A recent photograph

- A completed curriculum vitae

- Legalized copy of the birth certificate



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Global Information on the web:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents

Hydrography

Brochures and documents



[Information Brochure](#)



[Academic calendar 2015 - 2016](#)



[Study Guide with detailed curricula 2014 - 2015](#) (minor updates after June 2015)



[Entry requirements](#)



[Examination Regulations IVH 2015-2016](#)



[Enrolment procedure Non-EEA students 2015-2016](#)



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Information brochure:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/IVH_informatiebrochure_web_WEB.pdf

Academic calendar 2015-2016:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/15-16_ACADEMIC_CALENDAR_Hydrography_B_WEB.pdf

Study Guide with detailed curricula 2014-2015 (minor updates after June 2015):

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/Study_guide_Hydrography_B_14-15.pdf

Entry requirements:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/15-16_Entry_requirements_WEB.pdf

Examination regulations 2015-2016:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/15-16_IVH_Examination_regulations_WEB.pdf

Enrolment procedure Non-EEA students 2015-2016:

http://www.hzs.be/images/andere_opleidingen/Hydro-documents/15-16_HZS-ML-D128-711_Enrolment_procedure_Non-EEA_students_WEB.pdf



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+32 (0)3 205 64 81

<http://www.hzs.be/en/other-training/hydrography/introduction>

<https://www.linkedin.com/grp/home?gid=4353315>

<https://www.facebook.com/InstituteForHydrography>

<https://www.youtube.com/watch?v=csXPulgXb4&feature=youtu.be>



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Conclusions

- The start in Belgium in 2012-2013 of the first IHO certified hydrography cat. B programme marks a milestone, but the programme is not yet very well known, as demonstrated by an inquiry survey of the Hydrographic Society Benelux (jan. 2015).
- The key asset of the programme is the unique cooperation formula between a Maritime Institute, a broad Academic University and hydrographic private companies.
- Special care was drawn to the quality assessment of both the program, using internal and external auditing, and of the fieldwork of the students by introducing the concept of a "Training Record Book".
- Suggestions for international cooperation are highly appreciated as demonstrated by the Erasmus Intensive Training Program "Vassiviere".



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Thank you for your attention



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