IHB File N° TA-6

CIRCULAR LETTER 89/2004
16th December 2004

5th COURSE ON "NAUTICAL CARTOGRAPHY"
AT THE INTERNATIONAL MARITIME ACADEMY (IMA)
TRIESTE, ITALY
(13 April – 07 December 2005)

Dear Hydrographer,

The International Maritime Academy (IMA) in Trieste has informed the IHB, on behalf of the Italian Authorities, that the fifth course on "Nautical Cartography" has been scheduled in 2005.

The course will start on Wednesday 13 April 2005 and will end on 7 December 2005.

This course is intended for twelve students from all countries. Government authorities responsible for Hydrography in their countries are requested to forward their candidates' applications to:

International Maritime Academy (IMA),
via Eduardo Weiss 15, 34127 Trieste,
Italy
Telephone: +39 040 350829, Fax: +39 040 350322 and E-mail imoima@imoima.org

through the **ITALIAN EMBASSY** in their country, with a copy to:

International Hydrographic Bureau (IHB)
4 Quai Antoine 1er B.P. 445 MC 98011 Monaco CEDEX
Principality of Monaco
Telephone: +377 93108100 Fax +377 93108140 E-mail info@ihb.mc

The nominations which are not sent to the Italian Embassies, will not be accepted, and therefore will not be taken into consideration for the selection. **Nominations must reach the IMA by 28 February 2005 at the latest.**

The support provided by IMA will cover travel expenses, local transport to Trieste, accommodation and food. **Money for other personal expenses (pocket money) must be provided by each STUDENT'S NATIONAL AUTHORITY. (See Annex 2).**

The course is of great importance for its objectives, its duration and the technical contents. It is hoped that the Hydrographic Community, and in particular the European Hydrographic Institutes are available and willing to give their support to IMA in terms of lecturers, on the basis of the requests which IMA will address directly to each country.

Information on the course programme and the logistics are provided in Annex 2. A copy of the Nomination Form is also attached (Annex 3).

On behalf of the Directing Committee,
Yours sincerely,

Captain Hugo GORZIGLIA
Director

Annex 1 - Distribution list
Annex 2 - Course Details & Logistics
Annex 3 - Nomination Form for Participation & Acceptance Form

DISTRIBUTION LIST

- All IHO Member States
- Selected Non-IHO Member States as appear in IHO Year Book; (including IHO Pending Member States)
- International Maritime Organization, Technical Co-operation Division, Mr. David Edwards, 4 Albert Embankment, London SE1 7SR
- European Commission, Directorate General for Energy and Transport, Mr. F. Karamitsos
- International Maritime Academy, Trieste, Italy.
- Italian Ministry of Foreign Affairs, Directorate General for Cooperation to Development, Piazzale della Farnesina 1, 00194 Rome, Italy.
- Italian Ministry of Foreign Affairs DGCS Ufficio IX, viale Tiziano 80 – Rome, Italy
- Dr. Riccardo Illy, President of the Region Friuli Venezia Giulia, , Via Carducci 6, 34133 Trieste.
- Dr. Lodovico Sonego, , Assessore Regionale ai Trasporti , Friuli-Venezia Giulia Region, via Giulia 75/1, 34125 Trieste, Italy.
- Prof. Domenico Romeo, Magnifico Rettore, University of Trieste, Piazzale Europa 1, 34100 Trieste, Italy.
- President of the Province of Trieste, Piazza Vittorio Veneto 4, 34132 Trieste, Italy.
- President of Trieste Port Authority, Punto Franco Vecchio, 34135 Trieste, Italy.
- President of Trieste Chamber of Commerce, Piazza della Borsa 14, 34100 Trieste, Italy.

DETAILS OF THE COURSE

- **Aim of the course**

The aim of the course is to train nautical cartographers, to be employed at Hydrographic Services and at other cartographic bodies, able to perform the following:

- Elaborate a cartographic scheme in accordance with local coastal morphology, maritime traffic and port features;
- Plan a new chart scheme, selecting proper projection size and scale, in accordance with pertinent cartographic scheme;
- Evaluate extant hydrographic and topographic data, in order to produce charts with both traditional and electronic systems;
- Compile a new chart, using traditional means as well as computer aided cartographic systems, in compliance with INT specifications;
- Acquire working knowledge of photomechanical and printing techniques, in order to be able to understand and evaluate issues connected with the production of traditional charts;
- Convert a traditional chart into an electronic chart, by digitising existing traditional charts in the standard format or alternatively, verifying – when necessary – a third party's digitisation;
- Acquire basic knowledge of the structure of geographically defined relational databases
- Update charts in both traditional and digital formats;
- Acquire awareness of legal aspects connected with nautical cartography

- **Attendees (entry requirements)**

Course applicants should belong to a Hydrographic Service or to other related National Cartographic Services responsible for nautical cartography and should at least hold the following requirements:
- four years service at a National Hydrographic Office or related National Cartographic Service and in addition an acceptable University Degree or a CAT B Course in Hydrography or Cartography.
- strictly relevant professional experience
- English language competence
- computer skills.

The selection of the students will be carried out by the Commission IHB – IMA which will examine case by case the curricula.

- **Number of participants**

In order to ensure maximum didactic efficacy, classes should not exceed 12 students.

- **Languages**

The course will be held in English

- **Course certificate, diploma**

The model course was produced by an international Working Group, with the co-ordination of the IMA and the supervision of the IHB.

The course was submitted to the FIG – IHO Advisory Board to obtain recognition "A" level.
Upon successful completion of the course, a document will be issued by the IMA certifying that the holder has successfully completed a course in Nautical Cartography.

COURSE OUTLINE

The duration of the course will be 35 weeks. Lessons will be, generally, 7 hours per day, from Monday to Friday, for a total number of 1240 hours.
The course has been subdivided into the following 15 modules.
Every module contains specific segments which are developed taking into consideration the requirement of the course and the time allocated.

Most modules end with a practical project. All aspects will be evaluated and will be used for determining the final course work.
Tests will be given on completion of the following modules: basics, geodesy, chart projections, databases, GIS applications, legal administrative aspects (Law of the Sea – Delimitations).

Term examinations will be conducted on conclusion of modules 8 and 15 and will be used together with the test marks and project marks, to determine the following formula:

Term Mark = [(Avg Test Mark + Avg Project Mark) x 40/100] + (Term Exam Mark) x 60/100.

MODULES

Subject Area	Hours	Subject Area	Hours
1. General ……10		**5. Marine Geography…… 35**	
1.1 Introduction……	2	5.1 General Geography of the Earth……	4
1.2 International Organisations……	4	5.2 Marine Geology and Sedimentology……	12
1.3 National Organisations……	4	5.3 Methods and Instrumentation used by marin geologists……	7
2. Basics…… 209		5.4 Oceanography……	12
2.1 Mathematics and Statistics……	80		
2.2 Information Technology and Communication……	100	**6. Navigation…… 35**	
2.3 Grid Computation……	21	6.1 General Principles……	7
2.4 Project 0……	8	6.2 Types of Navigation……	4
		6.3 Systems and Methods……	7
3. Geodesy…… 70		6.4 Port and Coastal Traffic Control……	3
3.1 General figure of the Earth……	7	6.5 Project 3……	14
3.2 Geometrical Foundations related to the Geodetic Reference Ellipsoid……	21	**7. Nautical Charts…… 63**	
3.3 Geodetic Datums and Datum Transformation……	21	7.1 Introduction……	6
3.4 Fundamentals of Three -Dimensional Geodesy……	14	7.2 Definitions……	6
3.5 Project 1……	7	7.3 Specifications……	14
		7.4 Chart Schemes……	9
4. Chart Projections…… 70		7.5 Production Systems and Methods……	14
4.1 General Concepts of Geodetic Projections……	18	7.6 Project 4……	14
4.2 Mercator Projection……	7	**8. Cartographic Data…… 80**	
4.3 Gaussian Conformal Mapping – Transverse Mercator……		8.1 General……	2
4.4 Universal Transverse Mercator System (UTM)……	7	8.2 Topography……	4
4.5 Conformal Lambert Projection……	7	8.3 Hydrography……	4
4.6 Universal Polar Stereographic Projection……	7	8.4 Navigational Aids and Navigational Systems……	3
4.7 Project 2……	10	8.5 Sailing Directions and Other Textual Information……	3
		8.6 Tides – Vertical Datums……	4

Subject Area	Hours
8.7 Photogrammetry and Aerial Photography	9
8.8 Satellite Imagery	9
8.9 Oceanographic Data	4
8.10 Marine Geology and Magnetic Data	3
8.11 Data Evaluation	6
8.12 Data Preparation	6
8.13 Data Assimilation	6
8.14 Quality Control	3
8.15 Project 5	14
9. Field Data	**70**
9.1 Preparation of Survey	7
9.2 Execution of Survey	24
9.3 Data Processing	7
9.4 Project 6	32
10. Traditional Cartography	**112**
10.1 Compilation	18
10.2 Drafting	3
10.3 Printing	7
10.4 Quality Control	7
10.5 Cartographic Maintenance	7
10.6 Project 7	70
11. Computer Assisted Cartography	**206**
11.1 Types of Digital Data: Raster, Vector	4
11.2 Digital Cartographic Systems	4
11.3 Data Capture Methods	10
11.4 Modelling Geographic Data in the Computer	10
11.5 Data Conversion Procedures	5
11.6 Data Acquisition Processing	10
11.7 Products	3
11.8 Quality Control	9
11.9 Cartographic Symbols Design	8
11.10 Digital Elevation Models	28
11.11 Spatial Databases	10
11.12 Project 8	105
12. Data Bases	**24**
12.1 Data Base General Concepts	3
12.2 Data Base Management System	7
12.3 Relational Data Model	7
12.4 Object Oriented Data Base	7
13. ENC Production	**158**
13.1 Theoretical Overview	25
13.2 Procedures, Methods and Tools	79
13.3 Project 9	54
14. Geographic Information System	**35**
14.1 Introduction to GIS	4
14.2 Geographic Information	4
14.3 Data Input	4
14.4 Data Output	4
14.5 Data Storage and Management	5
14.6 GIS Implementation	7
14.7 GIS Applications	7
15. Legal Administrative aspects	**42**
15.1 Product Liability	7
15.2 Copyright and Contracts	7
15.3 Law of the sea	7
15.4 Delimitation Zones	14
15.5 Project 10	7

PROJECTS

The projects to be completed at the end of each module are the following:

Project 0: The Project is based on a step-by-step development of simple applications in Delphi, by the students.

Project 1: Carry out spheroid transformation for a charted area, in order to determine the (plotted) x,y,z shifts at various chart scale coverages.

Project 2: Prepare projection calculations and overlapping compilation plots for each of the following projections: Mercator, Lambert, Gnomonic and Gauss.

Project 3: Plan a voyage, emphasising the types of navigation and the characteristics of the cartographic documents used or necessary

Project 4: Study and detail a specification of a chart scheme including the preparation of a development plan and the cost/effort evaluation.

Project 5: Collect, evaluate and prepare all source data for the area specified in the chart specification prepared in Project 4.

Project 6: Carry out a field survey, to collect miscellaneous data/information for the specified area.

Project 7: Prepare a chart compilation in accordance with the INT chart specification the projection plot prepared in Project 2 and the source data gathered in Projects 5 and 6.

Project 8: Using the chart specified in Project 4 and the data collected in project 5 and 6, digitise all relevant source data and then prepare a digital compilation of the same chart prepared in Project 7. Digital colour separation plates are to be prepared on completion of the compilation.

Project 9: Using geometric primitives from the digital data prepared in Project 7, prepare an ENC cell based on the S 57 standard (including all phases up to validation).

Project 10: Prepare lines of delimitation between opposite and contiguous states.

LOGISTICS

Accommodation: Twin-bedded rooms (two students per room) for the entire period of the course.

Food arrangements: breakfast, lunch and dinner will be provided by IMA.

Accident insurance will be provided by IMA.
Pocket money and other personal expenses will be at the charge of the organization to which the student belongs.

Assistance in obtaining a visa may be provided by IMA, but should be the responsibility of the National Organization.

Prepaid air tickets will be made available at a selected air company (will be communicated by IMA) in the country.

Note: The air ticket will have to be refunded in case of non-completion of the course

ANNEX 3 TO IHB CL 89/2004
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COURSE ON NAUTICAL CARTOGRAPHY
From 13 April to 7 December 2005

NOMINATION FORM FOR PARTICIPATION

A completed nomination form should be submitted to the Director of the International Maritime Academy,* Trieste, Italy **THROUGH THE ITALIAN EMBASSY ****, with a copy to the IHB Monaco***. Nominations should be made as early as possible, using a separate form for each nomination, indicating clearly the Government's priority if more than one participant is nominated:

1. FAMILY NAME……

   FIRST NAME ……

   OTHER NAME ……

   TITLE……

2. Mailing address……

   ……

   ……

   Telephone (including country and local code)……

   Fax……

   E-Mail……

3. Nearest airport where air travel will commence and terminate:

   Name of airport……

   Location……

4. Date of birth……

5. Sex: Male Female

6. Place of birth……

7. Nationality……

8. Passport No. ……

9. Date and Place of Issue……

*International Maritime Academy, via Eduardo Weiss 15, 34127 Trieste, Italy. (Fax: +39 040 350322.e-mail: <imoima@imoima.org>)**__The nominations not transmitted to the Italian Embassy will not be accepted and taken into consideration__*** International Hydrographic Bureau, BP445, MC 98011 MONACO CEDEX, Principality of Monaco.(Fax: +377 93 10 81 40; e-mail: <info@ihb.mc>).

10. Person to notify in case of emergency:

Name ……

Address ……

……

Telephone……

Fax……

E-Mail……

11. Present position and description of duties……

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12. Organisation ……

13. Education (please attach Curriculum Vitae) ……

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14. Relevant professional experience ……

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15. English Language Competence ……

16. Computer skills ……

Nominee's signature ……

The above-mentioned person is nominated as our first/second possible participant in the course

Name and signature of Government official authenticating this nomination ……

Title ……

ACCEPTANCE FORM

I hereby accept the invitation of the International Maritime Academy (IMA) to participate in the Course on Nautical Cartography (from 13.4. – 7.12.2005).

I confirm that:

1. I will refrain from engaging in political, commercial and any activities other than those governed by the course programme;

2. I will advise the Academy immediately if I am unable to attend the course; and

3. I will travel to Trieste, Italy and return to my home country at the end of the course, as appropriate, by the route designated by the Academy.

Signature of Participant ……

Name of Participant……
(Printed)

Address ……

……

……

Date……