

IHB File No. TA-6

CIRCULAR LETTER 42/1999  
2 September 1999

**NEW COURSE ON "NAUTICAL CARTOGRAPHY"  
AT THE INTERNATIONAL MARITIME ACADEMY (IMA),  
TRIESTE, ITALY**

Dear Sir,

The International Maritime Academy (IMA) in Trieste has informed the IHB, on behalf of the Italian Authorities, that a new course on "Nautical Cartography" has been scheduled in 2000.

The course will start on Monday 21 February 2000 and will end on 25 November 2000.

This first course is intended for twelve students from beneficiary countries of the MEDA Project for Southern and South East Mediterranean Sea. Government authorities responsible for Hydrography in the twelve MEDA countries are requested to forward their candidates' applications to the 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 the International Hydrographic Bureau. **The nominations 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 1 December 1999 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, page 3).**

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).

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A second edition of the course will take place in the year 2001 and will be open to all IHO Member States and to those countries which are known to be actively considering to establish or to enhance their own hydrographic services.

It is therefore advisable that the countries interested, communicate to IMA their interest to send candidates to the courses for the year 2001.

Logistics and administrative matters will remain the same as those of the MEDA course.

On behalf of the Directing Committee,  
Yours sincerely,

Rear Admiral Giuseppe ANGRISANO  
President

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

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**DISTRIBUTION LIST**

- All IHO Member States
- All MEDA Project 7 countries :
 

|                       |                      |
|-----------------------|----------------------|
| ALGERIA               | (IHO Member State)   |
| CYPRUS                | (IHO Member State)   |
| EGYPT                 | (IHO Member State)   |
| ISRAEL                | (Non-IHO Member)     |
| JORDAN                | (Non-IHO Member)     |
| LEBANON               | (Non-IHO Member)     |
| MALTA                 | (Non-IHO Member)     |
| MOROCCO               | (Pending IHO Member) |
| PALESTINIAN AUTHORITY | (Non-IHO Member)     |
| SYRIA                 | (IHO Member State)   |
| TUNISIA               | (IHO Member State)   |
| TURKEY                | (IHO Member State)   |
- MEDA Project 7 Steering Committee Members:  
France, Greece, Italy, Spain, EC DGIB Meda Projects – Mr. Lauren,  
EC DGVII Maritime Transport – Head of Division Mr. W. De Ruiter.
- International Maritime Academy, Trieste, Italy.
- Italian Ministry of Foreign Affairs, Directorate General for Cooperation to  
Development, Rome, Italy.
- Italian Ministry of Foreign Affairs DGCS Ufficio XIII, viale Tiziano 80 – Rome, Italy
- Friuli-Venezia Giulia Region, Assessore Regionale ai Trasporti – Avv. W. Santarossa,  
via Giulia 75/1, 34125 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.
- University of Trieste – Magnifico Rettore, Piazzale Europa 1 (Rettorato), 34100  
Trieste, Italy.
- President of Trieste Chamber of Commerce, Piazza della Borsa 14, 34100 Trieste, Italy.

## DETAILS OF THE COURSE

### Background

#### ▪ Requirements for the Course

At present nautical cartographers are trained at Hydrographic institutes through in-house training. This usually applies to most Services with sufficient resources to make qualified nautical cartographers available for dedicated training requirements.

Generally speaking, HOs – having to deal with both traditional and innovative responsibilities - are usually affected by a lack of personnel, thus resulting in difficulties in providing training.

Newly – established HOs obviously may not be in a position to provide any in-housing training.

It was therefore felt that there exists a need for an appropriate institution, capable of organizing courses for nautical cartographers, and able to develop such courses (as was recently recommended by the IHB).

At present there is no nautical cartographic school in the Mediterranean area. It was recognized that in view of the ever developing automated cartographic technologies and the consequent pressures on the HO's to produce electronic nautical charts (ENC), a formal course in nautical cartography should be organised. The course should be offered by a recognized training institution and should offer subjects of great interest to HO's, both for developed and for developing countries, in order to improve staff knowledge and introduce new technology.

#### ▪ Aim of the course and prospective users

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, 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 digitizing existing traditional charts in the standard format or alternatively, verifying – when necessary – a third party's digitization;
- 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 bodies responsible for nautical cartography and should at least hold a Higher School Completion Certificate.

- **Total duration**

9 months (1 academic year)

- **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 is produced by an international Working Group, with the co-ordination of the IMA and the supervision of the IHB.

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 9 months (40 weeks). Lessons will be, generally, 7 hours per day, from Monday to Friday, for a total number of 1400 hours.

The course has been subdivided into the following 15 modules (shown overleaf).

Every module contains specific segments which are developed taking into consideration the requirement of the course and the time allocated.

The programme includes complementary activities such as visits to cartographic institutes and printing organizations.

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.

| <i>Modules</i>  | <i>Hours</i> |  |
|---|--------------|--|
| <b>GENERAL INTRODUCTION .....</b>   | <b>5</b>     |  |
| <b>1. Basics .....</b>  | <b>120</b>   |  |
| 1.1 Mathematics and Statistics .....  | 70           |  |
| 1.2 Computers .....   | 50           |  |
| <b>2. General .....</b>   | <b>20</b>    |  |
| 2.1 Introduction .....  | 4            |  |
| 2.2 International Organizations .....   | 8            |  |
| 2.3 National Organizations .....  | 8            |  |
| <b>3. Geodesy .....</b>   | <b>70</b>    |  |
| 3.1 General Figure of the Earth .....   | 7            |  |
| 3.2 Geometrical Foundations relate<br>to Geodetic Reference Ellipsoid .....   | 14           |  |
| 3.3 Reference Systems-<br>Geodetic Datums .....                               | 14           |  |
| 3.4 Fundamentals of Three-Dimensional<br>Geodesy .....                        | 14           |  |
| 3.5 The Geodesic (Orthodromic) and<br>Loxodromic Curve on the Ellipsoid ..... | 14           |  |
| 3.6 Project Work: 1 .....   | 7            |  |
| <b>4. Chart Projections .....</b>   | <b>70</b>    |  |
| 4.1 General Theory .....  | 14           |  |
| 4.2 Mercator Projection .....   | 3            |  |
| 4.3 Gaussian Projections .....  | 14           |  |
| 4.4 Lambert Projection .....  | 7            |  |
| 4.5 Polar Stereographic .....   | 7            |  |
| 4.6 Cartographic Projections .....  | 14           |  |
| 4.7 Summary of Geodesy and<br>Projections .....                               | 4            |  |
| 4.8 Project 2 .....   | 7            |  |
| <b>5. Navigation .....</b>  | <b>70</b>    |  |
| 5.1 General Principles .....  | 7            |  |
| 5.2 Types of Navigation .....   | 6            |  |
| 5.3 Systems and Methods .....   | 15           |  |
| 5.4 Port and Coastal traffic .....  | 3            |  |
| 5.5 Hydrographic notes .....  | 4            |  |
| 5.6 Project 3 .....   | 35           |  |
| <b>6. Nautical Charts .....</b>   | <b>70</b>    |  |
| 6.1 Introduction .....  | 4            |  |
| 6.2 Definitions .....   | 6            |  |
| 6.3 Specifications .....  | 14           |  |
| 6.4 Chart Schemes .....   | 9            |  |
| 6.5 Production systems-methods .....  | 2            |  |
| 6.6 Project 4 .....   | 35           |  |
| <b>7. Cartographic data .....</b>   | <b>105</b>   |  |
| 7.1 General .....   | 2            |  |
| 7.2 Topography .....  | 4            |  |
| 7.3 Hydrography .....   | 4            |  |
| 7.4 Navigational Aids and<br>Navigational Systems .....                       | 3            |  |
| 7.5 Sailing Directions and other<br>textual information .....                 | 3            |  |
| 7.6 Tides-vertical datums .....   | 4            |  |
| 7.7 Photogrammetry and aerial<br>photography .....                            | 4            |  |
| 7.8 Satellite imagery .....   | 4            |  |
| 7.9 Data evaluation .....   | 6            |  |
| 7.10 Data preparation .....   | 6            |  |
| 7.11 Data assimilation .....  | 6            |  |
| 7.12 Quality control .....  | 3            |  |
| 7.13 Project 5 .....  | 56           |  |
| <b>8. Field data .....</b>  | <b>105</b>   |  |
| 8.1 Topography .....  | 8            |  |
| 8.2 Hydrography .....   | 8            |  |
| 8.3 Reconnaissance .....  | 7            |  |
| 8.4 Oceanography .....  | 8            |  |
| 8.5 Marine geology .....  | 4            |  |
| 8.6 Project 6 .....   | 70           |  |
| 9. Traditional cartography .....  | 140          |  |
| 9.1 Compilation .....   | 20           |  |
| 9.2 Drafting .....  | 3            |  |
| 9.3 Printing .....  | 3            |  |
| 9.4 Quality control .....   | 9            |  |
| 9.5 Project 7 .....   | 105          |  |
| <b>10. Computer assisted cartography .....</b>                                | <b>140</b>   |  |
| 10.1 Types of digital data: raster, vector .....                              | 4            |  |
| 10.2 Digital cartographic systems .....                                       | 4            |  |
| 10.3 Data capture methods .....   | 10           |  |
| 10.4 Migration procedures .....   | 5            |  |
| 10.5 Products .....   | 3            |  |
| 10.6 Quality control .....  | 9            |  |
| 10.7 Project 8 .....  | 105          |  |
| <b>11. Databases .....</b>  | <b>56</b>    |  |
| 11.1 Relational databases .....   | 24           |  |
| 11.2 Object oriented databases .....  | 32           |  |

|   |            |  |           |
|---|------------|--|-----------|
| <b>12. ENC Production .....</b>           | <b>266</b> | 14.2 Theoretical approach .....                  | 39        |
| 12.1 Theoretical overview .....           | 49         | 14.3 Special issues .....                        | 25        |
| 12.2 Procedures, methods and tools .....  | 133        |  |           |
| 12.3 Project 9 .....                      | 84         | <b>15. Legal Administrative aspects.....</b>     | <b>35</b> |
| <b>13. Cartographic maintenance .....</b> | <b>49</b>  | 15.1 Product liability .....                     | 7         |
| 13.1 Traditional .....                    | 7          | 15.2 Copyright.....                              | 2         |
| 13.2 Digital.....                         | 7          | 15.3 Recommendations .....                       | 2         |
| 13.3 ENC.....                             | 7          | 15.4 Resolutions .....                           | 2         |
| 13.4 Project 10 .....                     | 28         | 15.5 Law of the sea .....                        | 6         |
| <b>14. GIS applications .....</b>         | <b>70</b>  | 15.6 Delimitation zones.....                     | 7         |
| 14.1 Principles and criteria.....         | 6          | 15.7 Distribution of cartographic products ..... | 2         |
|   |            | 15.8 Project 11 .....                            | 7         |

### Complementary Activities

**Visits:** Technical visits will be held during the weeks dedicated to the ENC Production module

**Final Tests** 14 hours at the end of the course

## 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.

Health and accident insurance will be provided.

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**



**COURSE ON HYDROGRAPHIC DATA MANAGEMENT**  
From 30 August to 3 December 1999

**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 .....
2. Mailing address.....  
.....  
.....  
Telephone .....
- 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 .....

.....

12. Educational background.....

.....

.....

13. Previous experience .....

.....

.....

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 Hydrographic Data Management (30 August to 3 December 1999).

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 .....