MARINE CARTOGRAPHY AND DATA PROCESSING

IHO Category B Programme
THE TRAINING TEAM

150 years of Cartographic experience
SUBJECT MATTER EXPERTS

Law of the Sea
  Marine Law
  Intellectual Property
  Geodesy
  Tidal Theory
  Nautical Publications

IC- ENC RENC
  ENC Encryption
  IHO S-101
  Satellite Imagery
ACADEMIC BASELINE

STUDENT SELECTION CRITERIA

Applicants should be involved in the production and maintenance of navigational charts.

Organizations nominating should ensure that applicants will have the opportunity to apply the learning undertaken.

Good standard of English, written and spoken, with reasonable technical English.

A high standard in mathematics and geography.

A background in cartography or hydrographic surveying or other relevant experience.
ACADEMIC OBJECTIVE

Category B Programme

A programme which provides a practical comprehension of nautical cartography for individuals with the skill to carry out routine nautical cartographic tasks.

STANDARDS OF COMPETENCE for Nautical Cartographers

Publication S-8
Third Edition
Version 3.1.0 - December 2014

FIG/FIG/ICA INTERNATIONAL ADVISORY BOARD SYLLABUS – 3rd EDITION

<table>
<thead>
<tr>
<th>Item and Title</th>
<th>Level</th>
<th>Both Category B and A</th>
<th>Only for Category A</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3.1 Metadata</td>
<td></td>
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<tr>
<td>E3.2 Coastline and Topographic Data</td>
<td></td>
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<td>E3.3 Bathymetric Data</td>
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<td>E3.4 Horizontal and Vertical Datum</td>
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<td>E3.5 Digital Elevation Models</td>
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Guidance and Syllabus for Educational and Training Programmes
EVOLUTION OF THE COURSE

2009 – 2013

Marine Cartography

Data Assessment

ENC Production

2014 - 2016
COURSE PROGRAMME

- DISTANCE LEARNING
- FOUNDATION
- IHO S-57 TRANSFER STANDARD
- DATA BASE COMPILATION
- PRODUCT CONSTRUCTION
- DATA ASSESSMENT AND PRODUCT MAINTENANCE
- WORK EXPERIENCE
MODULE OBJECTIVES

**Foundation:** To understand the content, structure and standards of the standard paper nautical chart (SNC), electronic navigational chart (ENC) and nautical publications (NP).

**Compilation:** To construct and validate a hydrographic database (HDB) incorporating all relevant hydrographic and topographic source information from analogue and digital formats.

**Product Construction:** To design and produce an SNC and ENC from the HDB.

**Data Assessment and Product Maintenance:** To assess for navigation significant information, maintain the HDB and issue appropriate changes to SNC and ENCs.

**Final Assignment:** To unaided assess, produce SNC and ENC updates and compile a New Edition.
MODULE EVALUATIONS

Practical Exercises - practical cartographic exercises designed to complement the theory component. Summative exercises contribute to student module evaluation.

Training Project/Assignments - 5 weeks supervised and evaluated projects. These projects reflect the level of knowledge outlined in the syllabus, and a report is compiled and evaluated.

Final Project – 3 day source assessment and compilation project unsupervised and evaluated.

A module pass mark of 50% is to be achieved.
15 DAYS - FUNDAMENTALS OF CHARTING

- Types of charts
- Geodetics
- Projections
- Latitude and Longitude
- Grids
- Bearing and distance
- Chart Datum
- Source material
- Chart Design
- Chart Symbols and text
- Accuracy, precision and reliability
- Hydrography
- Depth Selection and contouring
- Nature of seabed
- Tide theory
- Navigational dangers and Wrecks
- Aids to Navigation
- Navigational Lights
- Law of the Sea
- Nautical Publications
- Routing Measures
- Navigational Buoyage
- Topography
- Magnetics
FIELD TRIP

- Distance Learning
- Foundation
- IHO S-57 Transfer Standard
- Data Base Compilation
- Product Construction
- Data Assessment and Product Maintenance
- Work Experience
10 DAYS

IHO S-57 Transfer Standard

- Understanding IHO S-57 Transfer Standard
- Overview of S-57 and its publications
- Data Capture Specifications
- Encoding Rocks, Wrecks, Obstructions and Seabed
- Depth areas and meta information
- Lights and Light Supports, Light Sectors
- Capturing Navigational Lines
- Encoding Chart Notes & Picture files
- Encoding Magnetic Variation
- Introduction to Hydrographic Database Production (HDB)
- HDB Quality Procedures

S-57 SOFTWARE FAMILIARISATION

- CARIS S-57 Composer

S-57 THEORY TEST
MODULE EVALUATION

DISTANCE LEARNING

FOUNDATION

IHO S-57 TRANSFER STANDARD

DATA BASE COMPILATION

PRODUCT CONSTRUCTION

DATA ASSESSMENT AND PRODUCT MAINTENANCE

WORK EXPERIENCE

S-57 THEORY ASSESSMENT

1. Which S-57 object class is used for manmade (artificial) roadlines?
   - SLOCON
   - CYLINDRE
   - COUUE
   - UNMARK

2. How is the "H" value obtained?
   - "H" is based on Mean High Water Spring
   - "H" is based on the Zero Depth
   - "H" is based on the value of the highest drying contour indicated in the source document

3. Which TWO mandatory attributes are missing from this light description?
   - SRSNR
   - SIGGRP
   - SIGSEQ
   - HEIGHT

4. Vertical Datum diagram - which defines the attribute VERLEN
   - a
   - b
   - c
   - d

5. Vertical Datum diagram - which defines the attribute HEIGHT
   - a
   - b
   - c
Practical module where the student will compile into a database all the relevant nautical chart content in compliance with IHO S-57 using CARIS S-57 Composer and CARIS Base Editor.
FIELD TRIP

BRISTOL PORT COMPANY

DISTANCE LEARNING

FOUNDATION

IHO S-57 TRANSFER STANDARD

DATABASE COMPILATION

PRODUCT CONSTRUCTION

DATA ASSESSMENT AND PRODUCT MAINTENANCE

WORK EXPERIENCE
MODULE EVALUATION

DISTANCE LEARNING

FOUNDATION

IHO S-57 TRANSFER STANDARD

DATA BASE COMPILATION

PRODUCT CONSTRUCTION

DATA ASSESSMENT AND PRODUCT MAINTENANCE

WORK EXPERIENCE

MARKFRAME

Bristol - King Road Compilation Project

<table>
<thead>
<tr>
<th>Student name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Marking of bathymetry - after the students have completed the depth selection and created the depth areas/dredged areas make a copy of their hop file by copying the hop file from their products folder. Load up the students cell and run the S-55 test for group 1 coverage, then load the key depths and contours geoloff and score their work. Obtain print out of the hop file (create geoloff of the hop file then load into isda and printout) to mark up any corrections if necessary.

<table>
<thead>
<tr>
<th>BATHYMETRY</th>
<th>Marks</th>
<th>Maximum Score</th>
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<tbody>
<tr>
<td>Port Approach Surveys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Shoals in restricted anchorage</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Key shoals, Cockburn Rock and Firth</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Key shoals outside restricted anchorage</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Deep in depth</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Adequate depths along N/A L/W</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Depths of discontinuity between surveys</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Density</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>River Surveys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep in narrow B. of restricted anchorage</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Appropriate river bed depths and density</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Contours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contours correct showing good generalisation</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Check accuracy of digitising - ensure adequate vertices and all contours intersecting</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Depth Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full group one cover (DEP/PARE)</td>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>
MODULE PROGRAMME

10 DAYS - Paper Chart Production

- Compilation and Publication Procedures
- Quality - Introduction to standards and policy documents Verification
- Intellectual Property Rights
- Raster Chart
- Production Overview
- Lithographic/POD Printing and Distribution

5 DAYS - ENC Production

- S-58 Validation
- Exchange Set
- RENCs and VARs
- ECDIS
- Data Encryption
- ENC consistency and encoding issues
- Future Standard (S-101)

Paper Chart and ENC Scheming
FIELD TRIP

DISTANCE LEARNING

FOUNDATION

IHO S-57 TRANSFER STANDARD

DATA BASE COMPILATION

PRODUCT CONSTRUCTION

DATA ASSESSMENT AND PRODUCT MAINTENANCE

WORK EXPERIENCE

BRITANNIA ROYAL NAVAL COLLEGE

ROYAL NAVY MARITIME TRAINING AREA

Delivering Royal Navy Training On The River Dart Since 1863.
MODULE EVALUATION

10 DAYS
Production of a Paper Chart using CARIS Paper Chart Composer
Verification of the Paper Chart

5 DAYS
Production of an ENC base cell including ENC validation and exchange set creation using CARIS S-57 Composer
MODULE PROGRAMME

15 DAYS

DATA ASSESSMENT
Decision making and the processing of new information using GIS software and traditional checking processes.

PRODUCT MAINTENANCE
Notice to Mariner updating of digital and paper products
New Edition maintenance of the ENC and Paper Chart

- Responsibilities of a Hydrographic Office
- Source Material
- Navigational Dangers
- Marine Accidents
- Marine Law and Product Liability
- Bilateral Arrangements
- Maintain Admiralty Products – Types of actions
- Maritime Safety Information – RNW
- Examination of incoming data principles
- Photogrammetric data/remote sensing
- Drafting Notice to Mariners
- ENC updates
- Notice to Mariner Block
- New Edition Principles
MODULE EVALUATION

- Distance Learning
- Foundation
- IHO S-57 Transfer Standard
- Data Base Compilation
- Product Construction
- Data Assessment and Product Maintenance
- Work Experience

DATA ASSESSMENT & DRAFTING NOTICE TO MARINER EXAMINATION

BRISTOL NEW EDITION ASSIGNMENT

FINAL PROJECT BRIXHAM
At least one year of varied experience in nautical cartographic work is necessary to reach the minimum level of competence.

Planning, chart design, data selection, quality control and quality assurance, chart production and others, are activities envisaged.

The time frame over which a programme is delivered cannot be more than five years.

Production of a work experience logbook is required.
ANY QUESTIONS?
THANK YOU