

HBB370 - Data Management

Présentation

Prérequis

Entry requirements

Good knowledge of mathematics, physics and English

Relationship to other courses:

HB300 – Information technology

HB310 – navigation

HB340 – Tides and currents

HB350 – Geodesy & cartographic systems

HB360 – Hydrographic surveying

HB380 – Geology & cartographic systems

HB390 – Legal aspect

HB500 – Hydrographic practice

Objectifs pédagogiques

Module Outline:

1. ANALOGUE DATA CAPTURE

- Manual input of alphanumeric data
- Raster scanning processes and vector digitisation
- Description of digitising systems and scanners
- Georeferencing of paper maps
- Description of digital data formats
- Digital data transfer exercises

1. DATA MANAGEMENT, PROCESSING AND ANALYSIS

Approximation and estimation

- Approximation and estimation procedures for survey measurements

Spatial data processing & analysis

- The concepts of Geographical Information Systems (GIS)
- The properties of spatial databases and Database Management Systems (DBMS)
- The concepts of raster and vector data, gridded and meshed models (including TINs)
- Spatial data selection algorithms: filtering, smoothing, approximation, estimation, correlation and analysis
- Digital Elevation Models (DEMs)

1. MARINE GIS

- The use of Geographical Information Systems (GIS) within the marine environment and their

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Code : HBB370

Unité d'enseignement de type mixte

3 crédits

Volume horaire de référence (+/- 10%) : **30 heures**

Responsabilité nationale :

EPN08 - Institut national des sciences et techniques de la mer (INTECHMER) / Claire MARION

- use in areas such as coastal zone management
- Graphic presentation of data from marine data bases
- Data and metadata management and nautical charting
- The electronic charting concept as a special form of GIS

1. DATA PRESENTATION

Visualization and presentation

- Cartographic semiology, colour theory and schemes, shading and illumination techniques
- Manual and automatic plotting and contouring of hydrographic data: resolution, scale and vertical exaggeration
- The use of vector and raster digitising and plotting systems
- Hydrographic applications of 3D modelling and visualisation

1. MARINE CARTOGRAPHY

- Chart compilation process and flow line
- Application in the production flow of the instructions of the General Bathymetric Chart of the Oceans (GEBCO):
- Nautical charting & production; Chart Compilation

The process involved in selecting soundings and features for the nautical chart from a hydrographic survey or other sources

- Assessing and maintaining data quality throughout the compilation process

1. COASTAL TOPOGRAPHY & MAPPING

- GNSS-based and ground survey techniques to delineate coastline and attached cultural features
- Coastline map creation with aerial photographs
- The use of Ground photography in the depiction of coastline topography
- Relation between tidal datums and charted shorelines

1. PUBLICATIONS

- Required hydrographic data for navigational publications (including tide tables, sailing directions, light lists, radio aids to navigation, port guides, and notice to Mariners)

1. CHART PRODUCTION / REPRODUCTION OF ANALOGUE MAPS

- The process of creating chart plates from graphic products and from digital files
- Production of the Chart out of multiple plates

1. DIGITAL MAPS

From digital data to digital maps (on nautical devices and on the web)

1. CORRECTION OF CHARTS

- The importance of updating nautical charts and the dissemination of chart corrections
- The responsibilities of each element in the sequence from surveyor to mariner

- Obtaining latest information and checking for old data

Compétences

Learning Outcomes:

1. To be able to create the required data types, part of a standard exchange format and to configure systems for secure storage, transfer and backup of survey data.
2. To be able to use data cleaning techniques using appropriate software, while distinguishing between noise, outliers and real features as well as assessing propagated errors of survey data.
3. Applying procedures used to assess, accept and reject data.
4. Being able to apply spatial data processing techniques to create DTMs or gridded surfaces and contouring, as well as applying estimation procedures to assess survey measurements and volume computations.
5. To explain the concepts of Spatial Data Infrastructures (SDIs); raster and vector data models.
6. To be able to use file types that support the exchange of hydrographic data to transfer data between acquisition, database and GIS environments.
7. Explain the concept and use of GIS within the marine environment.

Programme

Contenu

Lecture 1 Analog data capture

Lecture 2 Management, processing and analysis of spatial data

Lecture 3 Marine GIS

Lecture 4 Data presentation

Lecture 5 Marine Cartography

Lecture 6 Coastal Topography & Mapping

Lecture 7 Publications

Lecture 8 Chart Production / Reproduction of Analogue Maps

Lecture 9 Digital Maps

Lecture 10 Correction of Charts

Modalités de validation

- Contrôle continu
- Projet(s)
- Examen final

Description des modalités de validation

Evaluation

Evaluation form

Written examination, partly with multiple choice, partly with open questions.

Fieldwork – permanent evaluation of the practical exercises

Assessment methodology

The final figure of assessment is composed of:

50% (written examination)

50% (permanent evaluation)

Assessment criteria

Permanent evaluation: this evaluation is based upon the training record book in relation to the number of tasks carried out and the comments of the supervisor(s) expressed in written in the book; workshops: proof of attendance: reports, exercises.

Theory examination: quality of knowledge, insight, relation between subjects, ...